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THE DEVELOPMENT AND EVALUATION OF A DIAGNOSTICALLY BASED CURRICULUM FOR PRESCHOOL PSYCHO-SOCIALLY DEPRIVED CHILDREN. FINAL REPORT.

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This 3-year study investigated the effectiveness of a 1-year diagnostic preschool curriculum for improving the regular school adjustment and achievement of 142 five-year-old psychosocially disadvantaged Appalachian children. During each year approximately 15 children were placed into either an experimental preschool, a kindergarten contrast, or an at-home contrast group. Curriculum procedures and concomitant teaching practices were designed to remedy specifically diagnosed deficits of the experimental preschool group in the areas of intelligence and language, social, and motor development. At the end of each treatment year the experimental groups ranked significantly higher than the control groups in all areas. Followup study through the second grade for the first-year group and followup through the first grade for the second-year group indicated that the groups no longer differed significantly; however, the social development of the experimental groups continued to be significantly better. (EF)

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SUMMARY

Problem

The social problem that precipitated the initiation of the present study is the large number of children from psychosocially distorted homes who are unable to (1) do well on intelligence tests, (2) cope with public school instruction, or (3) develop their intellectual and personal behaviors to the extent present day theory assumes is possible (even for those we have labeled previously as cultural-familial retardates).

The above problem has been with us for several generations; however, the scientific psychological study of learning and intelligence is relatively recent. J. McV. Hunt (1961) has reorganized and reinterpreted data from a wide variety of sources and concludes that there is a possibility of educating intelligence if one can find the proper match between environmental encounter and the present status of the human organism. The problem then is related to the age old controversy of nature versus nurture, heredity versus environment, or nativism versus naturalism. The present study, however, is based on the assumption that experience, environment, and training are effective modifiers of intellect, for better or worse. With such an assumption it is proper to ask what kinds of experience, environment and training can be effective in enhancing the intellectual level, motoric abilities, and the personal-social behavior of children from psychosocially disadvantaged homes.

Scope of the Study

The present study was not intended as a support for the theoretical hypothesis that intelligence can be modified by experience. It was, instead, assumed that such modifications were possible, that there are many ways in which positive changes can be influenced, and that the target children needed an intervening set of experiences between that which they received at home and that which was to follow later in the public schools. The investigators knew that other research was being conducted with younger children, with children of different racial groups, and with brighter children. They also knew that some investigators were working with curriculum modifications, others with teaching strategies, others with parent education, and still others with various combinations of these foci. It appeared, however, that no one was attempting to work directly with the isolation of curriculum and teaching as the independent variable in connection with Appalachian, poverty-stricken, retarded children from rural and small town communities. Since this group is so much a part of the region in and around the investigator's home base and since our concern was with the prevention of progressive retardation, it was natural to focus on this group. In addition, the investigators wanted to fit within the realm of proximate possibilities as far as state support was concerned. Therefore, five-year-olds were the target age group.

Three studies with similar design were completed in three consecutive years (1964-1967) preceded by a one-semester pilot study. Children

who have been involved in the study are still being followed as they proceed through various public schools.

Objectives Pursued

More specifically, the objectives of the present study were to:

1. Identify and where necessary develop or adapt techniques and instruments useful in preschool diagnosis and that lead to productive curriculum practices.
2. Obtain data concerning the effective use of selected diagnostic tools in curriculum development for children with specified strengths and weaknesses in certain cognitive and affective areas related to school achievement and adjustment.
3. Develop and refine curriculum strategies for five-year-old psychosocially deprived children for purposes of ameliorating present cognitive, affective, and motoric deficits and for purposes of preventing future mental and educational retardation.
4. Evaluate the effectiveness of the diagnostically based curriculum strategies in terms of the purposes stated in objective number three.

Hypotheses

The total investigation was directed toward determining whether an intervention program composed mainly of a diagnostically-based kindergarten curriculum and its concomitant teaching strategies would increase the intellectual, language, motor and socialization abilities of a group of children to a greater extent than a more traditional kindergarten approach or no kindergarten experience at all.

The second hypothesis predicted that the children who had received the diagnostically-based kindergarten curriculum will perform better in public school first, second, third and so on, grades than children who had received a more traditional kindergarten, or those children who had received no kindergarten experience.

Method

The 142 five-year-old subjects of the study were drawn almost one hundred percent from a severely psychosocially disadvantaged population. Children included in the study scored between 50 and 85 on Form L-M of the Stanford-Binet Intelligence Scale. Eighty-two boys and 60 girls made up the sample. The intervention program occurred during what would have been their kindergarten year, had free public kindergartens been available in the area. Intervention was confined to the school day, and contact with parents was limited to that necessary to locate the children, enlist them in the study, and maintain attendance in the kindergarten groups. No efforts were made to modify the schools to which the children went when they were ready for the first grade.

Three studies were carried out. In each study approximately 15 five-year-olds were placed into either an Experimental Pre-school (EPS), Kindergarten Contrast (KC), or At-Home Contrast Group (AHC). Study I was conducted during the academic year 1964-65. As of the summer of 1967, the children have completed their second year of public or parochial school.

Study II children participated in 1965-66 and have completed their first year of regular school.

Study III children served as subjects during the 1966-67 year and will enter school in the fall of 1967.

Although the original intent was to replicate the basic study twice to accumulate larger numbers of subjects within each treatment condition, it cannot be overemphasized that the three studies are not precise replications of one another. The diagnostically developed curriculum was modified from one study to the next in order to incorporate the experiences gained from the previous year.

The diagnostically-based curriculum cannot easily be explicated in a summary. In general, the curriculum was an attempt to structure the learning experiences of the five-year-old retarded subjects in order to maximize the possibility of increasing their perceptual, cognitive, and social-personal development. The diagnostic approach was used in an effort to produce an optimal match between each child's past history and present status on such things as language development or fine motor development so that specific remediation procedures could be tailor made to his needs.

RESULTS: HYPOTHESIS I

This hypothesis predicts that a diagnostically based curriculum will ameliorate psychosocially disadvantaged environmental effects on the development of five year old children more effectively than a traditional kindergarten experience. Traditional kindergarten will, however, be more effective in such amelioration than continuing residence in the home without benefit of any preschool experiences. Such results will be evidenced in the areas of intelligence, language development, motor skills, and personal-social behavior.

Intelligence. Two measures of intelligence were administered, the Stanford-Binet and the Columbia Mental Maturity Scale (CMMS).

1. The EPS group showed significantly greater increments in Binet I.Q. than the KC group, when the subjects (Ss) from all three Studies were combined. In its turn, the KC group mean increment was greater than that for the AHC group.

2. For the CMMS, the mean for EPS children from all Studies was equal to the KC collapsed mean, but both groups significantly exceeded the AHC group. Directional differences were as predicted.

3. Mean I. Q. for both EPS and KC groups shifted from about the middle of the borderline retardation range to the classification of normal for both Binet and CMMS. The AHC group remained within the borderline retardation range.

4. Evidence from the present study suggests strongly that the experimental curriculum is more effective in increasing intelligence than is a traditional kindergarten curriculum. Evidence completely supports the conclusion that a preschool year is more effective than an analogous year spent at home without such school services.

Language. Hypothesis I advances the same prediction for language as for intellectual development.

5. Results unequivocally support the differential effectiveness of the EPS experience. Language skills were measured by the Peabody Picture Vocabulary Test (PPVT) and the Illinois Test of Psycholinguistic Abilities (ITPA), although results for the latter test were not available from pre- to posttest for Study II children. On both tests, EPS improved significantly more than KC, and KC significantly more than AHC.

6. Intervention experiences are even more effective for language than for intelligence development with the former showing both more relative and absolute gain than the very substantial gains demonstrated by intelligence. At posttest, EPS (and to a lesser degree, KC) children were performing at about the same level in measured intellectual and language skills, whereas at pretest they had been much more retarded in language.

Motor. Hypothesis I predicted that the order of gain for Fine Motor skills as a function of the intervention year would be in the following order: $EPS > KC > AHC$. No differences among groups were expected for Gross Motor skills. Total Motor skills were expected to follow the directional differences shown by Fine Motor, but only because Fine Motor test results were included in the Total Motor score.

7. Combined results for the children included in Studies II and III (the motor skills measure used for Study I was inappropriate for testing this hypothesis) on the Lincoln-Oseretsky Motor Development Scale reveal $EPS = KC$, and EPS and $KC > AHC$ for both Fine and Total Motor skills. The hypothesis is clearly supported for Study II children, but for the Study III group $EPS = KC$. The only definite conclusion that can be drawn is that a preschool experience is definitely superior to continuing at home as far as developing Fine Motor Skills is concerned.

There were no differences among groups in Gross Motor skills, as was predicted. (Parenthetically, it should be emphasized that all groups even at posttest show lower Fine, Gross, and Total Motor scores than middle-class children.)

Personal-Social Adjustment. Instruments were not available to make meaningful pre-post assessments of personal social skills. The only measure available for such assessment was an Intensity of Task Involve-

ment scale devised for use in the present study, used for Study III children only. From its results, it is concluded, more tentatively than for previous conclusions.

8. Limited evidence shows that the EPS curriculum is associated with more gains in intensity of involvement in teacher-directed tasks than is the KC experience.

RESULTS: HYPOTHESIS II

Hypothesis II predicted that, in their regular school years following the intervention program, EPS children would adjust more successfully than KC children, and that the KC groups would progress more satisfactorily in school than the AHC groups.

Follow-up one (F^1) data were gathered at the end of first grade for most children (some were excluded from school because of immaturity), and are available for two total groups, Study I and Study II.

Follow-up two (F^2) data, gathered at the end of the second school year following the intervention experience (second grade for most children), are available only for Study I children.

Results for intelligence, language, motor behavior, academic status, and personal-social adjustment are given below in that order.

Intelligence. The general prediction was that after either one or two years of school experience, intellectual status would rank in order: EPS > KC > AHC.

1. Binet I. Q. for the intervention groups (EPS and KC) was stable from posttest to F^1 . In other words, the gains shown at the end of the intervention period were not lost at the end of one year of regular school attendance.

2. Greater Binet I. Q. gains during the Grade 1 school year were made by the AHC than by the EPS and KC children.

3. Adjusted Binet F^1 means for the three treatment groups differed significantly from each other (from analysis of covariance). The order of adjusted means, from first to third rank, was EPS, AHC, and KC. The only significant between-group difference was EPS > KC.

4. Two of the three treatment groups (EPS and AHC), judging from Binet I. Q.s, have shifted from the formal classification of borderline mental retardation to the classification of intellectual normality.

5. F^1 adjusted means for the CMMS were available for only Study II children. Directionally, EPS was highest in CMMS I. Q., KC second, and AHC third. The F-ratio for among-group differences was not significant, and CMMS results classify only the EPS₂ group within the normal intelligence range.

6. At F^2 , all subgroups had moved from the intellectual classification of borderline retardation to the normal classification, according to Binet I. Q. Adjusted means among the groups did not differ significantly, although EPS retained first rank, followed in order by AHC-L (at-home local contrast group), AHC-D (at-home distal contrast group), and KC (EPS mean Binet I. Q. was 95 at F^2 , compared with 74.5 at pretest approximately 33 months previously).

7. At F^2 , according to the CMMS, all groups had also moved within the classification range of normal intelligence. There were no significant differences among groups and the rank order among means was opposite to prediction, with AHC-L ranking first, KC second, and EPS third (the differences are less than four points from the high to the low group. CMMS scores are not available for the AHC-D group).

Language. The general prediction made for language was that following either one or two years of school, the level of language performance would be $EPS > KC > AHC$.

8. Peabody Picture Vocabulary Test (PPVT) quotients remained relatively stable (although a sizable mean drop occurred for EPS and a sizable gain for KC) from posttest to F^1 for the intervention groups.

9. Greater differential PPVT gain during the Grade 1 school year was made by the AHC than by the EPS and KC children.

10. Adjusted PPVT F^1 means among the three treatment groups did not differ significantly from each other, as they did for the Binet, although EPS continued to rank first. AHC occupied second rank, while KC occupied third rank.

11. Only the EPS mean fell within the intellectual classification range of normal. Suggestively, it may be that the schools are less effective in maintaining language development than they are in maintaining general intelligence, at least for groups of children such as those of the present study.

12. Even though PPVT differences among groups had disappeared at F^1 , all children functioned more "evenly" than at the time of pretest (i.e., PPVT scores, far below Binet scores at pretesting, were much closer to Binet scores at F^1).

13. Illinois Test of Psycholinguistic Abilities (ITPA) results were available for only Study I children at F^1 . They parallel PPVT results: i.e., there were no among-groups mean differences, although EPS ranked first among the three groups (ITPA data were not available for AHC-D children). ITPA means differed in rank order from PPVT results (for which AHC-L ranked higher than KC), suggesting at a very low level of confidence that KC intervention had been more successful in the expressive functions represented by the ITPA than in the receptive function represented by the PPVT.

14. At F^2 , stabilization of PPVT mean quotients was evident for all

groups. The deceleration shown by EPS during Grade 1 continued through Grade 2 for EPS₁, and slight losses or essential PPVT quotient constancy occurred for the other Study I groups.

15. ITPA language gains from F¹ to F² exceeded expectancy for EPS₁ (if prediction is made from an assumption of language quotient constancy), and were at or somewhat below expectancy for KC₁ and AHC-L.

Motor. As for intelligence and language status, Hypothesis II, at its most general level, predicted that Fine and Total Motor skills behavior would be most advanced at the time follow-up data were gathered for EPS, and that KC would score significantly lower than EPS, but significantly higher than AHC. F¹ data are available only for the Study II groups.

16. At F¹, there were no differences among groups in mean Fine, Gross, or Total Motor scores, as measured by the Lincoln-Oseretsky Motor Development Scale (L-O), nor was the expected order either of means or gains demonstrated.

17. At F¹, all groups were markedly retarded in both Fine and Gross Motor skills compared with middle class children.

Academic. Hypothesis II predicted that academic status at both F¹ and F² would be highest for EPS, next for KC, and lowest for AHC.

18. According to the gross criterion of placement in regular grade, there was no clear difference among the groups in percent of children in regular grade placement at F¹, although a somewhat higher percentage of AHC children than of EPS or KC had been denied entrance to first grade because of judged immaturity.

19. At F², status as represented by percentages of children in regular grade placement show, if anything, the most favorable status for the two Study I AHC groups combined, intermediate status for EPS₁, and least favorable status for KC. Differences among the schools attended by the children in administrative practices and special facilities for educating typical children, however, reduce the meaningfulness of this comparison.

20. At F¹, EPS exceeded both KC and AHC in five criteria of educational achievement, but significantly only in Total Report Card Satisfactory Marks. While KC and AHC in no case differed significantly from each other, AHC exceeded KC in rank for four criteria of educational achievement, and KC exceeded AHC in rank for one.

21. At F², there were no significant differences among groups either in the informal criteria of academic achievement (teachers' marks) or standardized achievement test results. AHC-L actually ranked first in the former, but the rank order of the latter followed prediction, with EPS₁ standing highest in both Total Reading and Total Numerical results, KC second, and the AHC-L and AHC-D groups following in that order.

Personal-Social Adjustment. Personal-social adjustment indices following school experience were predicted to favor EPS over KC, and KC over AHC.

22. Teachers' judgments of Social Growth during the first grade year, made at F^1 , showed EPS significantly higher than KC or AHC. KC and AHC have almost identical means for this variable.

23. Teachers' (highly reliable) paired-comparison judgments for Personal-Social Adjustment at F^1 showed EPS significantly superior to KC. The status of AHC was intermediate between EPS and KC, but did not differ significantly from either.

24. As judged by their peers, EPS children were somewhat more popular and considerably less rejected than either KC or AHC children at F^1 . However, among-group differences for these assessments did not reach statistical significance.

25. At F^2 , but barely missing the level of statistical significance set for the present study, EPS_1 exceeded KC_1 and both AHC groups in paired-comparison teacher judgments of personal-social adjustment. Teacher Satisfactory Marks for Cultural Growth and for Social Growth failed to distinguish either reliably or consistently among the groups.

26. Sociometric data on friendship and rejection choices failed to discriminate significantly among the groups at F^2 , although EPS_1 and KC_1 showed rather large advantages in preferred friend status and were, as well, somewhat more rejected than the AHC groups. This may mean that they were more active social participants, both for better or worse.

INTRODUCTION

Problem

One of the major educational problems facing the nation is to prevent and/or remedy cognitive and affective deficits associated with severe cultural deprivation. Cognitive deficits already observable in the preschool years include intellectual subnormality, language and motor impairments, and inadequacies in concept formation. Affective deficits include problems of motivation, social adjustment, self concept, and delay of gratification. It is hypothesized that these deficits will produce progressive achievement decrements throughout formal schooling.

While disadvantaged children as a group are likely to exhibit these deficiencies to some degree, they are likely to be more dramatically exhibited by a subgroup of the disadvantaged often termed the psychosocially deprived. Kirk (1958) refers to psychosocial deprivation as poor psychological climate of the home coupled with low socio economic level of the family. Symptoms are: (a) dependence on social relief agencies; (b) low educational level of the parents; (c) low moral standards, such as indicated by police records and prostitution; (d) child abuse; (e) emotional instability of the parents; (f) and low intellectual level of the parents.

Not only were preschool services for disadvantaged children lacking, but there were almost no public kindergartens in the State of Indiana when this study was begun in 1964.¹ Thus, the investigators concentrated their research efforts on psychosocially deprived kindergarten-aged children. This group of children was in urgent need of an early school intervention program and, as a useful and practical strategy, also constituted a sample of the preschool population small enough that State funds might eventually be made available for its benefit. This choice of kindergarten-aged children for the project was therefore more pragmatic than is theoretically desirable from the standpoint of an ideal time for starting an intervention program.

In the one year available for intervention prior to first grade entrance, it was necessary that the experimental program include an intensive, structured, cognitively-oriented curriculum, designed to remedy the measured and observed cognitive and affective deficits of individual children.² Wherever possible, children with similar defects

¹Since the beginning of the study, permissive kindergartens have become possible within the framework of Indiana's public schools; and Head Start has been introduced in Bloomington, Indiana, where the headquarters of the study were located.

²Points of view about cultural deprivation and psychosocial disadvantage may be roughly grouped into (1) those that regard it as a deficit, possibly related to a more or less brief critical period of

were to be grouped for instructional purposes. This approach is hereafter referred to as a diagnostically-based curriculum.

The authors were interested in developing strategies of remediation from which lesson plans, specific methods of child control, and diagnostic procedures could evolve. Thus conceived, it was expected that methods would evolve steadily from the first through the third study. In this sense, the second year was not a replication of the first, or the third year a replication of the second. Thus, the three intervention years are referred to as Studies I, II, and III.

Objectives

1. To identify and where necessary develop or adapt techniques and instruments useful in preschool diagnosis and that lead to productive curriculum practices.
2. To obtain data concerning the effective use of selected diagnostic tools in curriculum development for children with specified strengths and weaknesses in certain cognitive and affective areas related to school achievement and adjustment.
3. To develop and refine curriculum strategies for five-year-old psychosocially deprived children for purposes of ameliorating present cognitive, affective, and motoric deficits and for purposes of preventing future mental and education retardation.
4. To evaluate the effectiveness of the diagnostically-based curriculum strategies in terms of the purposes stated in objective number three.

development and unlikely to be remediable thereafter; and (2) those that consider it a slowed rate of development, the gradient of which can be steepened by appropriate learning experiences. The first assumption introduces an urgency for action not demanded by the second. The present authors, in the absence of definitive evidence, are committed to neither extreme of these positions.

RELATED RESEARCH

The central thesis of the present research is related to the historical nature-nurture controversy. The development of the curriculum has reflected the current ferment concerning the nurture aspect of preschool (i.e., kindergarten and pre-kindergarten) education.

This section of the report is limited to the small number of data-based studies of psychosocially disadvantaged preschool aged children, particularly those whose subjects fall within the range of intellectual subnormality.

McCandless (1952), in a survey of the literature on environment and intelligence (with particular reference to mental retardation), suggests that neurologically normal retarded children have been subjected to two types of influence that contribute substantially and perhaps principally to their retardation. First, they have been deprived of the cognitive experiences necessary to function well in intelligence testing and school learning situations. Second, their emotional experiences have been such as to produce apathy and to blunt cognitive development.

The Effects of Preschool Interventions on Intelligence

Many of these studies are in progress. Therefore, the data are often incomplete, follow-up data into regular school have not yet been completed or reported, or only selected facets of the reports (as is true for the Israeli literature) are available.

The most positive long-term results seem to come from Israel (Silberman, 1964; Smilansky, 1964). It seems that a whole generation of culturally deprived and psychosocially disadvantaged children--e.g., the Yemeni, Algerian, Iraqi, and Moroccan immigrants to Israel--has literally been "pulled up by its bootstraps". The Israeli program has been an all-out phenomenon, lasting for many children from nursery through secondary school and involving as much innovation in the latter as in the former. In contrast, most of the United States studies have concentrated on one, two, or three years of preschool "intervention" or "compensatory" education, then have sent their graduates on to elementary school essentially unmodified by the curricular principles on which the compensatory educational experience was based.

The predictable results of this state of affairs are summarized by McCandless (1967, p. 608): "Intervention . . . raises children's I. Q.'s and provides them with skills needed for success in schools. . . . However, most frequently these differences completely or partially disappear by the end of first grade." The differences disappear largely from at home control group gains after school entrance rather than from experimental group losses.

One of the earliest of the pertinent studies followed almost accidental discoveries by Skeels and Dye (1939). Working in a State institution for the retarded, they discovered that two very severely retarded

girls living in a ward with older girls who gave them intensive attention showed dramatic gains in I. Q., eventually achieving normality and subsequently leading normal lives. This provocative finding was followed by a more formal investigation in which the authors transferred 13 mentally retarded children less than three years old from an overcrowded and unstimulating orphanage to an institution for the retarded (Skeels and Dye, 1939). Here, the children received intensive mothering from older retarded girls and special favors from ward attendants. The average I. Q. gain at the end of one and one-half years was 27.5 points. After this, the children were placed in foster or adoptive homes. Contrast children who had tested normal at the time of admission to the orphanage showed an average decrease of 26 points after about two years' residence.

A 30 year follow-up (Skeels, 1966) shows spectacular differences between the two groups, all of them in favor of the experimental group.

The Skeels and Dye studies were paralleled by a study that has been subjected to severe criticism by McNemar (1940). In the same unstimulating and overcrowded orphanage referred to above, Skeels, Updegraff, Wellman, and Williams (1938) introduced preschool experiences for selected children. A control group remained in the regular cottage program for preschool aged children. What now appears to have been a progressive decrement in I. Q. was arrested for the experimental group, but losses of great statistical and practical significance occurred for the control group.

Much later, stimulated partly by these Iowa studies (the skeptical regard for which was gradually eroding) and by the controversial Bernardine G. Schmidt (1946) study, Kirk (1958) approached the problem of intervention education for retarded preschool subjects with considerable methodological sophistication. He produced modest and lasting I. Q. increments for those of his subjects who were without organic involvement. Neurologically normal children from relatively adequate homes made the most progress. Four children who, coincident with the intervention experience, were moved from inadequate to good homes stood out from the others in terms of gains. Kirk's sample was small and, for his intervention group as a whole, the experimental children were not significantly superior to the controls at the end of one year of regular elementary or special class attendance.

Weikart (1967 a, b, and c) studied children within the same I. Q. range as the subjects of the present study. He also worked with their mothers. He found that intelligence test quotients changed conspicuously and favored the experimental children at the end of the intervention experience. However, the differences had disappeared by the end of a year of regular kindergarten attendance, although the experimental children were generally achieving somewhat better in school at the end of the second grade.

Gray and her colleagues (1962, 1965, 1966, 1966a and b; Klaus and Gray, 1962, 1965, 1966, 1967) report modest I. Q. and achievement advantages for their experimental groups persisting at the end of the second grade. Gray and her colleagues also involved the mothers in the educa-

tional process. It should be noted that their subjects averaged higher in initial I. Q. than those of subjects in the present author's, Kirk's, or Weikart's studies. Gray's children had either one, two, or three years of summer school experience, and had received regular "tutorial" home visits from trained workers throughout the year. Tutelage was employed in the broadest and most constructive sense.

Blatt and Garfunkel (1965), working with preschool children averaging in the low 90's in Binet I. Q., concluded after studying "The effects of nonautomated responsive environments on the intellectual and social competence of educable mentally retarded children" that there were no changes other than those that could be accounted for by the developmental process. Their method of subject selection (volunteer participants who had high residential stability in high delinquency slum areas) may have resulted in their subjects as a group being economically deprived but not necessarily psychosocially disadvantaged.

Curriculum Intervention Techniques

The following study, although published in 1942, is included at this point in the review of literature because it makes the transition from studies of deficit compensation to studies of specific curriculum development and evaluation.

Dawe (1942) approached the problem of deficit-amelioration through language teaching in a study that involved eleven pairs of children residing in an orphanage. When she began her study, the children ranged in age from 3 years, 7 months to 6 years, 10 months. Her experimental, or trained, children were very carefully matched with the control children for school group attended, sex, chronological and mental age, I. Q., and vocabulary. All the children were attending either the orphanage nursery school or kindergarten. Dawe provided her speech and language training on weekends for a total of 92 hours over a period of about seven and a half months.

At the beginning of her study, the experimental group averaged borderline retarded (I. Q. 80.6), as did her control group (I. Q. 81.5). The training consisted of help in understanding words and concepts, looking at and discussing pictures, and listening to poems and stories. Occasionally, she took them on short excursions, although this proved to be difficult within the organizational framework of the orphanage.

Dawe's experimental group of children gained an average of more than 14 points in I. Q. during the training period, whereas the controls dropped an average of 2 points. At the beginning of training, average I. Q.'s of the two groups were almost identical. At the end of the study they differed greatly, not only on the test originally given to them but on another form of the test. Even on a performance test there was an average difference of 5.5 points in favor of the experimental children, although language presumably does not greatly affect success on such a test (a rather dubious assumption). This latter difference, however, was not a significant one. Dawe's training did not include test-coaching, although her method of teaching may have

helped the experimental children approach problems with elements similar to those included in intelligence tests more efficiently.

Both groups of children gained in vocabulary, the experimentals 17-1/2 score points (words), the controls 10 score points. The experimentals gained significantly more than the controls. Information-test scores also increased significantly more for the experimental than for the control children. In addition, Dawe obtained measures of such factors as attentiveness and intellectual interest. Dramatic improvements in almost all aspects of these important traits occurred for the experimental group, but such measures were not available for the controls.

"Intervention curricula" range from loosely formulated early programs of "total living" (e.g., Skeels and Dye, 1939); through traditional nursery or preschool "enrichment and security giving" experiences (Skeels, Updegraff, Wellman, and Williams, 1938); to almost totally cognitive learning programs (Bereiter and Englemann, 1966). Most programs attack the two environmental "pathologies" listed by McCandless (1952). They provide somewhat structured opportunities to remedy cognitive deficits, and also stress therapeutic ("security and confidence giving") personal and social experiences to remedy affective deficits. The relative stress on these two approaches depends on the philosophy of nursery school education that a given investigator holds. The "cognitivists" and the "unfolders" have indulged in lively and often acrimonious debate. Multiple intervention programs such as those of Gray and her colleagues and Weikart apply substantially similar principles to working with mothers. Such projects have drawn on the best of instructional, group interaction techniques, and have provided many interesting and provocative techniques for working with lower-lower class families.

Hodges and Spicker (1967) summarize the curriculum philosophy of Gray's Early Training Project: "The program was derived from certain assumptions based on the available literature concerning variables which contribute to the progressive achievement decrement (PAD) of culturally disadvantaged children as they enter and progress through the school. . . . Culturally deprived children are thought to have deficiencies in aptitudes for achievement and attitudes toward achievement which exist because of differences in stimulus and reinforcement conditions among lower class families when compared to middle class families. Therefore, the program was directed toward the enhancement of: (a) aptitudes for achievement, such as perceptual, cognitive, and language development; and (b) attitudes toward achievement, such as achievement motivation, persistence, ability to delay gratification, and interest in school type activities and materials (pp. 29-30)."

Weikart's reported program is similar in kind, and is well-summarized in Weikart, Kamii, and Radin (1964). His current efforts more than his earlier work are based on the theories set forth by Piaget (Weikart, 1967 a).

Work with mothers is designed to buttress the school program as well as to elicit maternal and total family interest and cooperation, and up-

grade home enrichment patterns. Hess and Shipman (1965) provide a vivid account of the practices and coping techniques used by mothers of psychosocially disadvantaged children.

Sprigle, Van de Reit, and Van de Reit (1967) report striking changes in intelligence and achievement following exposure to a Piaget-based curriculum. However, Sprigle himself handled the experimental group and suggests that he may have supplied unusual motivation in his teaching (as well as special skills: the authors). Follow-up school data are not yet available for these children.

Blatt and Garfunkel (1965, p. 104) summarize the aims and objectives of their curriculum as follows: "Rather than wait for readiness for academic learnings to develop, we strove actively to develop it. We tried to achieve this end in three principal ways: (1) by helping the children learn how to function socially in a group instruction situation so as to be maximally receptive to that instruction; (2) by providing a concentration of experiences designed to arouse curiosity and to promote attitudes of inquisitiveness and positiveness toward learning; and (3) by deliberately attempting to provide training in certain psychological functions generally considered to be fundamental to the later acquisition of academic skills in the primary grades."

All intervention programs include strong emphasis on language, some of it based on language analysis of lower-lower and middle socioeconomic class groups (e.g., Bernstein, 1960). Specific language lesson plans have been devised by Dunn and Smith (1965), by Bereiter and Engelmann (1966), and by Stearns (1966). The lessons by Stearns were developed as part of the present study, and are described later in detail. Definitive evaluations of none of the language programs are as yet available. Instead of structured language lessons, Weikart (1967a) uses a "verbal bombardment" technique, in which the teacher constantly questions and comments so as to draw the child's attention to critical aspects of his environment.

In general, more specific plans have been described for developing cognition and academically related skills than have been made available for developing social skills and improving personal-social adjustment. To the present authors' knowledge, the Indiana study described here has made the most specific assessment and applied the most specific remediation to the fine motor skills which, along with language, seem to be singularly poor in groups of children such as are the concern of this paper (e.g., Francis and Rarick, 1959; Malpass, 1960; and Sloan, 1951).

The belief that fine motor skill deficits play a crucial part in academic failure is supported by promising, but mixed, results from such diagnostic and predictive tests as the Frostig, Bender Gestalt, and Winterhaven. Performance items, usually depending to some degree on motor responses, are included in most standard general intelligence tests. Median correlations of about .60 have been reported between quotients based on batteries of such items and total I. Q. However, the respective contributions of motor skill per se as contrasted to problem

solving in the motor medium to such correlations are not known.

Conclusions

The studies and more general considerations described above lead to no clear conclusions. Samples and methods differ widely, organicity has complicated the picture (definitely, in one major study, to an unknown degree in others), and reporting and follow-up are often incomplete.

One suggested conclusion is that most United States' studies of compensatory education for psychosocially disadvantaged children begin too late and provide too little. However, the 30 year follow-up study reported by Skeels (1966), and the consensual although fragmentary reports from Israel suggest that "early and sufficient" intervention followed by extensive and intensive intervention within the public schools may indeed educate intelligence and combat not only psychosocial deprivation but prevent retardation.

The present investigation was designed to gather evidence on the effectiveness of applying an intensive one year specific curriculum intervention to a severely disadvantaged population without home intervention. If positive results ensue, the practical educational-social advantages will be very real. If not, a certain incentive for more drastic innovations (including family intervention) is indicated.

PROCEDURES

Design

Ten groups of psychosocially disadvantaged five year old children (approximately 14 in each) whose initial Stanford-Binet Intelligence Scale I. Q. scores ranged between 50 and 85 were selected from among several communities in central and southern Indiana for inclusion in the study. These children were chosen from among the most severely disadvantaged families that could be located in their respective communities.

The 10 groups were distributed among treatment procedures over three academic years as follows: three groups were exposed to a diagnostically based experimental curriculum; three groups were exposed to a non-experimental kindergarten; and four groups remained at home with no formal kindergarten program. The basic treatment period for each group extended over the academic year prior to the children's entrance into regular first grade classrooms.

There were to be three annual replications of a design that included an experimental kindergarten (EPS) and an at-home control (AHC) group in one community; and one traditional kindergarten (KC) and an at-home control group in a second community.

The authors' original plan was to randomly assign Ss from a pool of Ss to an at-home local (AHC-L) group and the experimental preschool (EPS) group. They knew that random assignment to the kindergarten (KC) and the at-home distal (AHC-D) groups would be impossible, because of the limited number of children in the small central and southern Indiana towns in which the study was conducted, who met the criteria for selection.

After the first year of the study, because of the introduction of Head Start in the largest of the towns involved (Bloomington), even the first plan had to be abandoned. In fact, by the time of the third year of the study, the EPS group had to be moved to another town because the Bloomington Head Start program had included almost all eligible children. However, throughout the study, whenever the population of a given town permitted some degree of random assignment, randomness was practiced. With the exception of Study I in which the EPS and AHC-L groups were constituted by random assignment, all groups were structured. Over-all, Ss were recruited from 7 different small towns and communities and at this stage of the study children are enrolled and/or residing in 41 schools in 27 different towns and communities.

The intent of the study was to provide a curriculum intervention for small community, semi-rural, psychosocially disadvantaged, retarded kindergarten age, predominately white children in an effort to fill a gap in previous and on-going studies of the effects of multiple intervention with younger Negro children or with other racial minority groups

(Deutsch, 1965; Gray & Klaus, 1966; Weikart, 1967a, b, c; Hess and Shipman, 1965; Blatt and Garfunkel, 1965; Fouracre, Connor, and Goldberg, 1964). In addition to the need for this particular type of age and racial data, the study was practically oriented to the absence of free public kindergartens in many southern and midwestern states, including Indiana.

At the time this study was initiated, there was no provision for free public school kindergartens in the State of Indiana, and none existed in any of the communities involved in the project. Project Head Start had not yet begun. Therefore, one important consideration was not only to develop a compensatory education program for the experimental group but also to build a program that, if successful and economically feasible, might be adopted and continued by the public schools. It was for this reason that the teacher to child ratio was smaller in the present study than that reported in the other experimental preschool projects (e.g., Weikart, 1965; Gray, 1965; Bereiter & Englemen, 1966). For the same reason, no work was done with the families of the subjects in the project other than visits to check the reasons for tardiness and absences of children from the experimental (EPS) and kindergarten contrast (KC) classes. Since the traditional kindergarten and the at-home groups were arbitrarily constructed, they are considered by the authors as contrast rather than control groups.

The data at the end of the first year of the project indicated that there were no differences in the two at-home groups. Since Ss were extremely difficult to locate and the expense involved in maintaining four groups of Ss did not appear to be justified, only one AHC was included in the design for Studies II and III. Horizontal diffusion such as reported by Gray and her co-workers (e.g., 1962, 1965, 1966a, b) seemed to play no part in the pre- and post-results for Study I. The investigators believe there are three reasons for this: (a) the towns from which the present sample came do not have clearly demarcated slum areas; rather, the poor live in a number of poverty pockets, or in semi-rural isolation; (b) the contrast groups came from as many as five different towns in a given year; and (c) the present investigation lacked the high visibility which a home visitor in a parent intervention program lends to a research undertaking: i.e., when families in a research population live as it were, next door to each other, visits to selected homes do not go unobserved, and neighborhood discussion of the content of the home visits is bound to occur.

Criteria for Selecting Subjects

The first criteria for subject selection was that of psychosocial deprivation. Most families in the project fell in the lowest level of the Warner, Meeker, and Eell's Index of Status Characteristics (1949). This social class scale was used only as a rough screening device because it does not attempt to differentiate among families at the lower end of the social class system. Furthermore, its classification criteria were not directly relevant to the project's sample selection because of the project's greater emphasis on functional clinically significant aspects of family functioning; i. e., what has been referred to here as

psychosocial deprivation as opposed to simple economic deprivation. An operational solution to this problem was to define psychosocial deprivation in terms of clinically derived judgments of family dysfunction. These judgments were made by the project's senior social worker, by other social workers, and/or graduate psychology students. Consensus among raters determined which families met the criteria of psychosocial deprivation. A four-point rating scale was used to classify families as minimally, moderately, heavily, and grossly psychosocially disadvantaged.

In addition to psychosocial deprivation, the second criterion for subject selection was that initial Binet I. Q. test scores fell within one standard error of measurement from 50 to 85.³ The authors realize that a selection criterion of an initial I. Q. score based on the first testing of a five year old almost certainly maximized factors that result in a low I. Q., such as lack of rapport, errors of measurement, and poor test reliability. However, children who experience the greatest difficulty in testing situations are likely to be those who most need an intervention program before school entrance. One can argue that those children best able to cope with the test situation are those most likely to adjust to school, while those least able to handle the test situation are less likely to do well in school.

Assessment and Diagnostic Techniques

For all groups involved in the project, various measures tapping cognition and personal-social functioning were administered before and at the end of the kindergarten intervention period and at the end of each year of regular schooling.

The criterion of success for the curriculum was originally to have been achievement demonstrated by the children in the first three years of school. At the time of this report, the children in Study I have completed their second year in school; Study II children have completed one year in school; and the groups in Study III enter school in the Fall of 1967. In order to attain minimally adequate achievement data from all three years' groups, a follow-up for at least three more years is required. At that time (Spring of 1968) all groups will have been in regular school for at least one year. Table 1 summarizes the present status of the investigation.

Table 2 lists all measures used in the project, including medical-physical examination and cognitive, affective, and achievement assessments. Some techniques were used for screening children, some for pre- and post- measures of change over the period of the intervention, some for diagnostic curriculum purposes, some for follow-up information, and others for a combination of these purposes. Table 3 delineates the instruments used, their purpose, and the groups to which they were applied.

³Two clerical errors resulted in 2 AHC-L children of 90 I. Q. at pretest.

Table 1

Design and Status of Studies I, II, and III by Groups and Years

Year	TREATMENT				
	Diagnostic Kindergarten	Regular Kindergarten	No Kindergarten	First Grade	Second Grade
1964-65	EPS ₁	KC ₁	AHC-L ₁ AHC-D ₁		
1965-66	EPS ₂	KC ₂	AHC ₂	All Study I Groups	
1966-67	EPS ₃	KC ₃	AHC ₃	All Study II Groups	All Study I Groups

Table 2
Instruments of Assessment

Medical-Physical	Pre- and Post-test Measures of Cognition	Achievement Measures	Affective Measures
Optometric Psychiatric Neurological Pediatric	^a Stanford-Binet, Form L-M Peabody Picture Vocabulary Test Raven's Progressive Matrices Goodenough Draw-a-Man ^a Illinois Test of Psycho-linguistic Abilities Lincoln-Oseretsky Motor Development Scale San Francisco Inventory of Communicative Effectiveness Caldwell Preschool Inventory ^a Frostig Test of Visual Perception Optometric Evulation Articulation ^a Columbia Mental Maturity Scale <u>Demographic Data</u> 1. Warner-Meeker-Eell's <u>Index of Status Characteristics</u> 2. Wolf Interview Form	Eight-Point Reading Scale Teacher Paired-Comparison on: a. Number Skills b. Reading Skills California Achievement Test School Report Card	Teacher Paired Comparison on: a. Personal-social adjustment Sociometric Task Involvement Scale

^aThese instruments were used to formulate diagnostic curriculum plans as well as to provide measures of change.

Table 3

Test Schedule for Studies I, II, and III

Instrument	Time and Study					
	Fall	Spring	Fall	Spring	Fall	Spring
	1964	1965	1965	1966	1966	1967
1. Revised Stanford-Binet, L-M	I ^a	I	II ^b	I, II	III ^c	I, II, III
2. Peabody Picture Vocabulary Test	I	I	II	I, II	III	I, II, III
3. Illinois Tests of Psycholinguistic Abilities	I	I		I	III	I, II, III
4. Columbia Mental Maturity	I	I	II	II	III	I, II, III
5. Frostig Developmental Tests of Visual Perception	I	I				
6. Raven's Progressive Matrices (Colored)	I	I				
7. Goodenough Draw-a-Man	I	I				
8. Caldwell Preschool Inventory			II	II	III	III
9. Reverse PPVT			II	II	III	III
10. Picture Language Sample			II	II		
11. San Francisco Inventory of Communication Effectiveness					III	III
12. Task Involvement Scale			II	II	III	III
13. Report Cards				I		I, II
14. Teacher Paired-Comparison-Personal-Social				I		I, II
15. Teacher Paired Comparison-Number Concepts				I		II
16. Teacher Paired Comparison-Reading				I		II
17. Eight-Point Reading Scale				I		II
^a I=Study I (1964-65) ^b II=Study II (1965-66) ^c III=Study III (1966-67)						

Screening

During all three years of the project the children were screened for medical and physical anomalies, and corrections were made when necessary and possible. During each year of the project, some children were fitted with glasses to correct minor visual difficulties detected by the consulting optometrist (two children in Study I, four in Study II, and two in Study III). Any suspicion of neurological impairment resulted in a referral to the Indiana University Medical Center for a complete neurological examination.

Physical examinations were conducted so as to rule out children with gross central nervous system pathology as well as point the way to modifying other correctable deficits that might have interfered with attendance and/or performance in the intervention or contrast programs and with later school performance. Physical examination data also provided clues for shaping teaching strategies and curriculum innovations for specific children. For example, the results of optometric evaluations for some children were used to develop skills in tracking moving objects without head-turning. This is a helpful skill for reading and is thus relevant to a diagnostically-based curriculum.

No children were included in the project for whom there were disabilities other than poor prognosis for school achievement associated with psychosocial deprivation. While several children who on psychological examination appeared to have coordination problems indicative of a possible neurological impairment were given complete neurological examinations, none demonstrated symptoms serious enough to be excluded from the study.

Repeated Measures, Assessment of Changes, and Diagnostic Instruments

Several instruments were used to assess the children's cognitive strengths and weaknesses. Results were used in initial plans for grouping children for instruction and in shaping appropriate curricula for them. Some instruments were employed as pre- and post- test measures to assess the immediate influence of the kindergarten experience as opposed to the temporally more distant criterion represented by achievement at the end of each year of formal (regular) school.

Relying on an instrument such as the Stanford-Binet to serve both as a pre- and post- test criterion instrument and as a source of diagnostic information for preparing curriculum suggests serious contamination of criterion and treatment. Eventually, however, not only was the Stanford-Binet used as a pre- and post- test and diagnostic instrument, but so were the Illinois Test of Psycholinguistic Ability (ITPA), the Columbia Mental Maturity Scale (CMMS), and the Peabody Picture Vocabulary Test (PPVT). In actual practice, the use of these instruments did not lead to curriculum-criterion contamination since initial pre-testing simply provided a report of the initial status of the children. The actual bases for the diagnostic curriculum were daily teacher-project staff observations made during the children's evolving instruction (for total class, sub-groups, and individuals).

Examiner Selection and Training

Psychological examiners were recruited from the pool of advanced graduate students in the educational psychology, school psychology, and special education training programs. All examiners were competent in administering individual and group tests, and had been trained in behavioral observation and interviewing techniques. Specialists, such as speech therapists, optometrists, and psychiatrists, were drawn into the project as needed.

Pre- and post-testing were not done blind, but stress was laid on objectivity of approach to all children, on developing adequate rapport, and on maintaining constant testing conditions.

The pressure of completing all testing during a relatively short period of time at the beginning and end of the school year was extremely heavy. If nothing else, the examiners may simply have been too busy for systematic bias to have operated. Examination of test protocols, spot-checks on examiners, and scrutiny of results all lead the authors to believe that examiner strength, weaknesses, and errors are random in nature, and operate neither for nor against the hypothesis of the effectiveness of an intervention experience on later academic progress. The investigators believe that the testing was generally well-done and without consistent bias. Follow-up criterion measures on school achievement, sociometric status, and personal-social adjustment were obtained by teachers and by examiners who did not know which children were in experimental or contrast groups and who also were naive with regard to the hypothesized outcome of the study. With one exception, none of the present authors did any of the testing, and he only during the pre-testing phase of Study I (due to a critical shortage of available examiners).

Description of the Subject Population

The Indiana Project has actively involved 143 children from 130 families. Developmental data as well as observational and socio-economic data are available for all families. Tables 4 through 11 summarize these data.

All of the 130 families that had been studied during the three years of the project were classified, at the time of writing (Summer, 1967), as lower class according to the Warner-Meeker-Eell's (1949) Index of Status Characteristics (I. S. C.). Eleven and one half percent were rated as clearly in the upper-lower class range; 33 percent were rated as borderline between lower-lower and upper-lower (I. S. C. score between 66 and 69); and 55 1/2 percent were rated as clearly lower-lower.

It has already been stated that the I. S. C. has limited use in the present study because it does not differentiate among families at the lower end of the social scale. Another limitation is that the I. S. C. characterizes a family at only one point in time. These characteristics are all subject to change over time. In fact, as knowledgeable workers have observed, temporal fluctuations in family functioning are quite common among low income families.

Table 4

Socioeconomic Status and Degree of Deprivation for Studies I, II, and III

Group	^a Degree of Deprivation - Percent						^b Socioeconomic Status - Percent	
	N	0	1	2	3	4	1	2
EPS ₁ 64-65	12		33.4	8.3	50.0	8.3	33.0	67.0
EPS ₂ 65-66	16		18.8	18.7	50.0	12.5	18.8	81.2
EPS ₃ 66-67	14		14.3	42.9	35.7	7.1	42.9	57.1
KC ₁ 64-65	13		15.4	62.2	7.7	7.7	24.1	76.9
KC ₂ 65-66	15		20.0	33.3	20.0	26.7	20.0	80.0
KC ₃ 66-67	15	6.7	33.3	40.0	13.3	6.7	46.7	53.3
AHC ₁ 64-65	27		11.1	63.0	25.9		29.6	70.4
AHC ₂ 65-66	16		12.5	43.8	31.2	12.5	31.2	68.8
AHC ₃ 66-67	14			64.3	21.4	14.3	14.3	85.7
Total EPS	42		21.4	23.8	45.3	9.5	31.0	69.0
Total KC	43	2.3	23.2	46.5	14.0	14.0	30.2	69.8
Total AHC	57		8.8	57.9	26.3	7.0	26.3	73.7
Grand Total	142	0.7	16.9	44.4	28.2	9.8	28.9	71.1

^aDegree of psycho-social deprivation
made by project social worker.

1 - Minimal

3 - Heavy

2 - Moderate

4 - Gross

^bWarner-Meeker-Eell's Index of
Status Characteristics

1 - Upper Lower

2 - Lower Lower

Table 5

Home and Family Data for Studies I, II, and III

Group	N	Number of Rooms Mean	Number Living in Home Mean	Density Col. 2/ Col. 1	Length of Time in Home Mean
EPS ₁	13	4.15	6.69	1.61	2.83
EPS ₂	16	4.12	6.25	1.52	4.33
EPS ₃	14	4.67	7.00	1.50	3.57
KC ₁	13	4.23	7.54	1.78	7.60
KC ₂	16	4.06	7.00	1.72	4.07
KC ₃	15	4.13	7.07	1.71	4.45
AHC-L ₁	14	4.50	6.50	1.44	1.75
AHC-D ₁	13	4.69	6.54	1.39	7.44
AHC ₂	16	4.31	7.25	1.68	2.32
AHC ₃	13	4.38	6.85	1.56	1.44
Total EPS	43	4.43	6.63	1.50	3.62
Total KC	44	4.14	7.18	1.73	5.17
Total AHC	56	4.46	6.80	1.52	3.15
Grand Total	143	4.35	6.87	1.58	3.84

Table 6
Housing Status for Studies I, II, and III

Group	N	Percent Own	Percent Rent	Percent No Inside Water	Percent No Toilet	Percent No Bath	Percent Modern Heat
EPS	44	43.2	56.8	40.9	56.8	61.4	52.3
KC	44	45.4	54.5	22.7	29.5	47.7	31.8
AHC	56	39.3	60.7	10.7	28.6	32.1	41.1
Grand Total	144	42.4	57.6	23.6	37.5	45.8	41.9

Table 7

Demographic Data on Fathers for Studies I, II, and III

Group	N	Chronological Age		Age at First Marriage		Grade at End of Education		Number of Siblings	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS ₁ , 64-65	13	30.38	5.72	19.78	2.88	8.80	2.15	5.67	4.60
EPS ₂ , 65-66	16	34.88	8.86	23.75	7.19	7.57	1.82	6.64	3.45
EPS ₃ , 66-67	15	37.20	10.23	23.00	5.31	7.73	1.82	5.33	3.04
KC ₁ , 64-65	13	37.08	10.83	22.22	5.80	5.38	2.29	6.15	2.08
KC ₂ , 65-66	16	35.06	8.43	24.08	9.65	7.12	2.34	7.19	3.04
KC ₃ , 66-67	15	35.40	9.82	21.36	3.10	7.13	2.50	7.07	3.13
AHCL ₁ , 64-65	14	35.64	8.07	19.20	7.05	8.54	2.30	5.36	2.53
AHCD ₁ , 64-65	13	37.08	9.60	19.60	3.03	7.77	3.75	5.00	2.32
AHC ₂ , 65-66	16	35.95	6.01	20.69	3.30	8.15	2.08	5.87	3.42
AHC ₃ , 66-67	13	29.54	4.14	20.62	2.87	9.15	1.86	6.17	3.04
Total EPS	44	34.34	8.85	22.03	5.97	7.95	1.93	5.88	3.63
Total KC	44	35.77	9.47	22.28	3.95	6.61	2.48	6.84	2.79
Total AHC	56	33.35	7.62	20.11	4.16	8.40	2.58	5.62	2.89
Grand Total	144	34.40	8.75	21.32	5.59	7.69	2.48	6.09	3.11

Table 8

Demographic Data on Mothers for Studies I, II, and III

Group	N	Chronological Age		Age at First Marriage		Grade at End of Education		Number of Siblings		Number of Children	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS ₁ , 64-65	13	28.77	5.14	18.08	2.72	9.54	2.88	6.31	2.84	4.77	2.01
EPS ₂ , 65-66	16	28.44	4.73	17.12	2.14	7.81	2.06	6.25	2.64	4.31	1.63
EPS ₃ , 66-67	15	29.60	6.74	17.20	2.24	7.67	1.59	7.27	4.37	5.27	1.98
KC ₁ , 64-65	13	32.23	5.93	18.08	1.63	7.23	2.16	6.38	3.29	5.15	2.91
KC ₂ , 65-66	16	30.38	5.07	16.88	1.71	8.38	1.56	6.12	3.52	5.38	2.60
KC ₃ , 66-67	15	30.33	6.68	17.07	1.71	7.67	1.76	7.27	3.15	5.33	2.09
AHCL ₁ , 64-65	14	33.07	8.32	17.69	1.57	9.00	2.48	6.43	3.46	5.50	2.24
AHCD ₁ , 64-65	13	32.92	8.35	18.25	1.23	9.15	1.91	4.62	3.60	4.62	1.98
AHC ₂ , 65-66	16	30.25	6.34	17.36	2.02	8.19	2.58	6.88	3.70	4.88	2.25
AHC ₃ , 66-67	13	27.62	4.66	17.85	2.51	8.23	1.96	8.46	4.25	5.00	1.63
Total EPS	44	28.93	5.51	17.43	2.37	8.27	2.32	6.61	3.35	4.77	1.88
Total KC	44	30.91	5.86	17.30	2.13	7.80	1.85	6.59	3.30	5.30	2.50
Total AHC	56	30.96	7.54	17.77	2.49	8.62	2.32	6.43	4.18	4.11	2.03
Total Grand Total	144	30.33	6.43	17.51	2.33	8.26	2.18	6.60	3.52	5.02	2.06

Table 9

Societal Role for Fathers - Studies I, II, and III

Groups	N	Religious Affiliation							Work Status					
		Funda- mental- ist %	Protest- ant %	Catholic %	Jewish %	None %	Other %	Unknown %	Unem- ployed %	Prison %	Un- skilled %	Semi- skilled %	Skilled %	Unknown %
EPS ₁	13	30.8				46.2		23.0	15.4		61.5	7.7	7.7	7.7
EPS ₂	16	12.5				50.0		37.5		12.5	62.5	18.8	6.2	
EPS ₃	15	20.0	26.7			46.7		6.6	20.0		13.4	33.3	33.3	
KC ₁	13		7.7			69.2		23.1		7.7	92.3			
KC ₂	16	6.2	12.5	6.3		50.0		25.0		6.2	87.5			6.3
KC ₃	15	20.0	13.3	6.7		60.0		7.0	6.7		40.0	6.5	46.7	
AHCL ₁	14	21.4	7.2			50.0		21.4	14.3		64.3	7.1	14.3	
AHCD ₁	13	15.4	15.4			46.1		23.1	7.7	7.7	69.2	7.7	7.7	
AHC ₂	16	25.0	31.2			43.8			6.2		62.5	12.5		18.8
AHC ₃	13		30.8	7.7		46.29	15.3				61.5	30.8		7.7
Total EPS	44	20.04	9.1			47.8		22.7	11.4	4.5	45.5	20.4	15.9	2.3
Total KC	44	9.1	11.4	4.5		59.1		15.9	2.3	4.5	72.7	2.3	15.9	2.3
Total AHC	56	16.1	21.4	1.8		46.4	3.6	10.7	7.1	1.8	64.3	14.3	5.4	7.1
Grand Total	144	15.3	14.6	2.1		50.7	1.4	15.9	6.9	3.5	61.1	12.5	11.8	4.2

Table 10

Societal Role for Mothers - Studies I, II, and III

		Religious Affiliation							Work Status				
Groups	N	Primitive Protestant %	Protestant %	Catholic %	Jewish %	None %	Other %		Housewife %	Skilled %	Unskilled %	Not Specified %	Semi- skilled %
EPS ₁	13	53.8	7.7		7.7	30.8			53.8		23.1	23.1	
EPS ₂	16	37.5	12.5			50.0			50.0		31.2	18.8	
EPS ₃	15	40.0	26.3			33.3			80.0		13.3	6.7	
KC ₁	13	30.8	53.8			15.4			76.9		15.4	7.7	
KC ₂	16	25.0	43.8			31.2			56.3		12.5	31.2	
KC ₃	15	33.3	26.7			40.0			66.6	6.7	20.0		6.7
AHCL ₁	14	28.6	7.1	7.1		57.2			28.6		21.4	35.7	14.3
AHCD ₁	13	30.8	38.4			7.7	23.1		76.9		7.7	15.4	
AHC ₂	16	31.2	37.5			25.0	6.3		87.5		12.5		
AHC ₃	13	30.8	38.4			7.7	23.1		84.6		15.4		
Total EPS	44	43.2	15.9		2.3	38.6			61.4		22.7	15.9	
Total KC	44	29.5	40.9			29.6			65.9	2.3	15.9	13.6	2.3
Total AHC	56	30.3	30.4	1.8		25.0	7.1		69.6		4.3	12.5	3.6
Grand Total	144	34.0	29.2	0.7	10.0	34.5	2.8		66.0	0.7	17.4	13.8	2.1

Table 11

Initial Status on Selection Criteria
for Studies I, II, and III

Group	N	Sex		Mean Chronological Age in Months	Mean I.Q.
		M	F		
EPS I	12	7	5	64	74.5
EPS II	16	9	7	63	76.8
EPS III	14	7	7	66	69.1
KC I	13	6	7	67	72.7
KC II	16	10	6	67	75.2
KC III	15	7	8	66	77.6
AHC-L I	13	9	4	63	74.5
AHC-D I	13	9	4	65	72.5
AHC II	16	8	8	65	73.5
AHC III	14	9	5	65	74.8
Total	142	82	60		

To offset this rating problem, the clinical impressions used in classifying project families were formed through multiple observations over time. Thus, a temporary rise or decline in a family's functioning and/or status would not be taken as evidence of the family's typical functioning level.

Classification was performed after all family data were in. Because clinical judgment over time was the method used, exact formular quantification seemed premature. Rather, families were assigned to one of the four categories: (1) minimal, (2) moderate, (3) heavy, and (4) gross psychosocial deprivation. Since the across time impressions were most comprehensively known by the senior project social worker, his ratings were obtained. After 90 days, the project worker again assigned the families to one of four degrees of psychosocial deprivation without referring to his earlier ratings. Upon comparison of the two assignments, no family was found to be placed more than one category away from its original position. A rank correlation coefficient was then computed as .836, showing a relatively high stability of assignment.

With the exception of four Negro boys (one EPS, two AHC-D, and one AHC-L), the population meeting the criteria for inclusion consisted of 139 Appalachian white children. A description of the home lives of these children clarifies what is meant by psychosocial deprivation. No adult male was present in 20 percent of the homes. The median household consisted of seven persons living in four rooms. The children in the study had from one to 13 siblings. The median number of siblings was four. Many mothers (one-third) worked at unskilled jobs. This figure fits well with recent data gathered for a North Carolina Appalachian population of mothers of elementary school children, where it was found that 42 percent of the mothers worked, almost all at semi- or unskilled labor (Garner and Sperry, 1967). The typical mother had completed the eighth grade, the father the seventh. This finding is identical with the Garner and Sperry data. Women in their sample were higher in socioeconomic status but resided in more isolated rural areas than the present population.

Not only were the homes overcrowded, but the majority of them were literally shacks. Nearly 40 percent of the houses were without indoor toilets, and coal or wood stoves provided the source of heat and/or cooking in an even larger percentage. Nearly one-fourth of the homes were without running water. However, many of these families (42 percent) owned or were buying their property, and the families were not transient by contemporary standards. Average residence in the same house was almost four years.

Family information gathered by the project social worker documented the fact that most of the families fell into the category of multi-problem hard-core poverty. Of the 42 Bloomington families in the study, 67 percent were known to the school social worker, 76 percent were known to the Department of Public Welfare (88 percent if services to members of extended family are included), and 81 percent were known to the police (32 fathers, 4 mothers, 12 children). Family dysfunction took varied forms. Some typical patterns were: parental attitude of passive

fatalistic acceptance of poverty and stagnation with accompanying casual neglect of children; fearfulness and suspiciousness resulting in attempts at withdrawal and smothering over-protection of children; and impulsive aggressive acting out with dramatic exposure of children to crisis and trauma.

The mothers and fathers had married young, they came from large families and, although almost without exception the mothers were still within their childbearing years, they already had large families (an average of five living children). The average mother had married at the age of 17 1/2, the average father at a little past 21. At the time data were collected, the mothers' mean age was a little more than 30 years, the fathers' about 34 1/2 years. The typical mother came from a family of seven to eight (up to 18) children, and the typical father had six brothers and sisters.

Seven percent of the fathers were unemployed, three and one-half percent in prison. Sixty-one percent worked at unskilled, 12.5 percent at semiskilled, and less than 12 percent at skilled trades. None was a white collar worker, and the whereabouts and current status of about four percent of the fathers were completely unknown.

Neither the fathers nor mothers were believers. In communities where church is customarily a first responsibility of citizens, almost one-third of the mothers and more than half of the fathers admitted to no church membership or attendance. This underscores their community isolation. Of those who belonged to or attended church, about half of both the mothers and fathers belonged to Fundamentalist, Primitive Protestant churches. There were only three fathers and one mother who were Catholic.

The investigators, judging both from published descriptive data about Appalachian populations and from their own experiences, believe the group which the subjects of the present study represent is very similar to analogous, hardcore, Appalachian poor such as are found in the more isolated rural regions of the Border States and the South. Such co-populations are heavily concentrated in the small and medium sized towns which were the sites of this study. Because of increasing rural to urban migration, they are also numerous in the city slums of the South, the Border States, and the Midwest. Birmingham, Atlanta, Nashville, Memphis, Dayton, Toledo, Detroit, Indianapolis, St. Louis, and Chicago, for example, have heavy concentrations of children very like those who were subjects in the present study.

One criterion by which the need for intervention among the children involved in this study can be documented is the success or failure of their elder siblings within the school system. The 143 Study children have 263 elder siblings in school. Eighty percent of these siblings are having moderate to severe difficulty in school as judged by being over-age for grade, enrolled in special classes, or passing the regular grade at a border line level. Approximately 50 percent of older siblings aged sixteen or older have dropped out of school.

Illustrative Case Studies

Brief descriptions of the home environments of a few of the subjects included in the Indiana Project demonstrate the nature of the psychosocial deprivation used as a subject-selection criteria.

Subject 1 is a girl who was enrolled in the first year experimental preschool class. This youngster lived in an old, long established poverty pocket in the city of Bloomington. The families living in this area almost without exception represent gross cultural deprivation. Most of the homes are littered shanties with a privy as a fixture in the yard.

The subject lived with her mother and a fourteen year old sister in a small two room match box home. Her maternal grandmother lived on the same lot in a small two room house trailer. The subject's home had inside water, but no toilet or bath. Wood and coal were used for heating and bottled gas for cooking. The family did not have a car or radio, although they did have a television set.

When interviewed by a project social worker, the mother responded to questions in an intelligent manner. In the process of gathering basic family data, she understood the questions readily and quickly recalled the information needed. Her responses to questions about family life and children indicated middle class attitudes concerning child rearing principles. She discussed the subject's problems with understanding, appearing to recognize her strengths and limitations. She had worked for a brief time as a factory worker but currently was receiving A. D. C. from the Department of Public Welfare. In addition, she worked a few days as a domestic. She and the subject's father had been divorced for seven years at the time of the project's first contact with her. She had had five children, of whom three had been placed in foster homes. The two children in the home included a thirteen year old daughter who had been returned home after a series of unsuccessful foster home placements, and the subject who was enrolled in the study. The mother had attended school until she was 17 years old and had completed the ninth grade. The maternal grandmother appeared to assume most of the care of the subject and to serve as "head of the family." The mother was an alcoholic who frequented the neighborhood tavern and often brought men home with her. She slept late in the morning and, while giving lip service to the importance of the subject's attendance at school, seldom made any attempt to have her ready when the school bus or taxi came. The general impression of the subject's mother was that she was not unintelligent, but rather so unstable emotionally that she did not function adequately in meeting routine responsibilities.

It is interesting to note that the children in this family, both those living at home and those in foster homes, had I. Q.s reported as ranging from the mid 90's to 105, but all were underachieving in school.

The subject herself was a tall, thin child. She was quick-tempered, willful, and generally negative in her responses to adult guidance. She usually chose one of the less aggressive children in the class as her only friend, but was so possessive and bossy in the relationship that the

friendship was of short duration. She did not join in group games or activities until the middle of the school year.

Although hyperactive, her motor development was good. She was one of the few children in the class who could skip and who did well from the beginning in pencil-paper tasks. Her initial Binet I. Q. was 84, her Peabody Picture Vocabulary quotient 61.

Despite adjustment problems and frequent absences, this child made a 3 point I. Q. gain on the Stanford-Binet and 38 point I. Q. gain on the Peabody Picture Vocabulary at the end of the treatment year. On the California Achievement Test given at the end of the second year, she scored at or above grade level in both Reading and Arithmetic sub-tests.

During the middle of her first year in school she was placed in a foster home as a result of the mother's alcoholism and the maternal grandmother's death. The current reports of her behavior give a very different picture of the child. Instead of a restless, demanding, rather disagreeable youngster, she is reported by her teacher as being a happy, popular girl who is doing well in school.

Subject 2 is a boy who was enrolled in the second year experimental preschool class. Like Subject 1, this youngster also lived in an old, well-known poverty pocket in another section of Bloomington.

Subject 2 lived with his mother, four siblings, his maternal grandmother, a male cousin of the mother's. The house was a three room shanty. Their house had neither running water, toilet, nor bath. The family did not own a car, but they had a radio and the inevitable T. V. set. The mother had lived in this area all her life.

The mother came from a large family which included six siblings. Subject's 2 mother was a rather attractive appearing woman who was usually well-dressed. However, a doctor who conducted a routine physical examination had reported that he had never examined as physically dirty a person. She had a gay, rather volatile type of personality. She had completed the 8th grade of school when 14 years old, at which time she married. This marriage lasted only a few years. It was followed by divorce and marriage to the father of Subject 2. The second husband was serving time at the State Penitentiary and she had divorced him.

She had held a variety of semi-skilled jobs, never holding one for any length of time. She had been a bakery clerk, a nurse's aid, and a Head Start Teacher's aid.

Although she expressed appropriate middle-class values on topics related to social behavior and child rearing, she paid little attention to any of them in her own social conduct or in rearing her five children. They were dirty, had ragged clothing, and seemed to be undernourished. Her own mother lived across the street in a more adequate dwelling with inside plumbing and a telephone. The community welfare worker frequently urged the mother to take the children to their grandmother's for a bath. This was done only occasionally and irregularly. The mother's social life consisted of drinking parties with various men. Subject 2 was

often confused about the male adults in his home, some of whom seemed to serve as surrogate fathers.

The older siblings of Subject 2 had a checkered school record. The oldest girl, 12 years old, was a bright (I. Q. 114) junior high student who achieved well despite frequent absences. However, her chief interest was reported to be boys and there was some concern that she would follow her mother's social living pattern. An 11 year old brother was having real problems in school. His I. Q. was reported at 80, but he was so aggressively hostile that he could not function in a regular classroom and attended a special education class. A nine year old brother (reported I. Q. 103) was doing reasonably adequate work in a regular fourth grade class.

Subject 2 was a scrawny, dirty, obstreperous boy. He most nearly approached aggressive acting out of any of the 143 children in the study. However, he had an engaging grin and was quick to respond to any display of affection on the part of the adults in the class. Thus, even though he was difficult to handle in the class, he was something of a favorite with the teachers.

He was rough in his play, often pummeling the other boys. He was not well coordinated, however, in either gross or fine motor behavior. In fact, he was never able to copy a simple geometric shape successfully.

This boy required continuous psychologically oriented guidance to achieve even token participation in any class activity. Both concrete and social rewards were used in working with him. The most effective punishment was found to be forcing him to sit on a chair and watch the other children. At times this required that he be held in place bodily.

His initial Binet I. Q. was 75, and his initial PPVT 67. He gained only two points on the Binet, but 30 points on the PPVT during the intervention year. His Binet gain was the lowest of any EPS child. His regular school adjustment was very poor. The first grade teacher was not able to handle him and he was placed in a special education class a few weeks after the beginning of school.

Subject 3 is a boy enrolled in the second year experimental preschool class. His family lives in a converted store building in a well known poverty neighborhood. The mother and father lived together with their seven children in four rooms. There was inside water, but no toilet or bath. Coal was used for heat and electricity for cooking. The family had a radio, T. V. set, and a 1957 Ford Station Wagon that was usually in such poor repair as to be unusable. The family took the daily paper, but there was no evidence of any other type of reading material. There was no church affiliation.

The father was considerably older than the mother. He was 49 and she 35 at the time of this report. This was his second marriage. There may have been children of his first marriage, but the seven children now in the home are the progeny of his second marriage. The father stayed in school until 19 years old and completed the 9th grade. At the time

of this report, he was working as a janitor in an apartment building in Bloomington. He had held this job for the past three years. He had engaged in other types of unskilled labor, such as restaurant kitchen helper, stone quarry worker, and construction worker. A back injury resulting from a fall prior to this present janitor's job had severely impaired the family's already limited economic situation.

The father came from a small (two siblings) family. His mother had been confined to a State Mental Hospital from the time he was two years old. Little is known about his father. He had been reared by maternal grandparents on a small, dirt farm in south-central Indiana about 18 miles from Bloomington. He had never been outside the state. There is some evidence that he is a problem drinker who at times beats his wife.

The mother is partially deaf and has almost unintelligible speech. She attended school until the age of 16 years, completing the 6th grade in the Bloomington schools. She was one of seven children and her father was a stone mill worker. Her deafness was reported to be the result of scarlet fever when she was one year old, so that it is questionable how much she gained from her schooling. She cannot read, and problems of communication during interviews were extreme. The mother has never worked outside the home. She is a heavy, unkempt, dull-appearing woman. She claimed to be in poor health, but was reluctant to discuss this in detail. Some of her health problems appeared to be related to beatings and she was probably afraid of reprisals if she discussed the situation in any detail. The seven children in the family, of whom five were in school, were reported as poor achievers except for one girl in the 4th grade who was doing average work. Undoubtedly the children in this family suffered not only the limited language experiences associated with their cultural deprivation, but were even further limited in this development by the mother's deafness and poor speech.

Subject 3 was a physically well developed boy, but had some of the clinical stigmata of mongoloidism. He appeared to be one of the most poorly functioning children in the group. He seldom talked, seemed confused in following directions, and either quietly withdrew or joined group activities as a passive observer.

His initial Binet I. Q. was 64, his PPVT quotient 34. The project staff considered excluding him from the study at one point because of the suspected mongoloidism. However, this child made rather dramatic progress throughout the program. His posttest Binet showed a gain of 27 points, and his PPVT gain was 53 points. In view of his phenomenal growth, the authors believe that the child's poor function at the beginning of the program was related not only to poverty and general psychosocial deprivation, but to particularly acute disadvantage because of the mother's deafness and serious language handicap. The progress reports from his first grade teacher indicate good general adjustment, but poor academic achievement. For example, he was reading at a pre-primer level at the end of the year.

CURRICULUM

The curriculum, as suggested in Related Research, was designed to approach two major, functionally inseparable, equally important goals. The first goal was to promote the personal-social adjustment of each child both so that he could cope with group learning situations and so that the group in turn could operate in such a way that effective learning would be facilitated. Once an approximation of this desired social balance was reached, the curriculum was then structured toward the second objective of promoting cognitive development within a relatively formal teaching-learning structure. This approximation was made on the basis of structured observations recorded on the behavioral check list shown in Appendix A. The aspect of the curriculum designed to meet the first of these goals may be thought of as the developmental curriculum, while the aspect designed to accomplish the second goal may be logically classified as the substantive curriculum. It should be repeated for emphasis that the procedures designed to reach the two goals were so overlapping as to be indistinguishable, and that developmental principles underlay all phases of the substantive curriculum.

The task of developing and implementing both curricula was the responsibility of a continuously functioning curriculum committee which included the project staff: a clinical psychologist, a school psychologist, a special educator, a reading specialist, and the teacher for the experimental group. Available to this committee were consultant services contributed by the project social worker, speech therapists, optometrists, physicians, and professors from art, music, and physical education at Indiana University. The committee's working schedule included weekly meetings, individually arranged weekly observations of the experimental class, less frequent observations of the kindergarten contrast class, and special training sessions with the experimental teachers.

As stated above, one of the criteria for the selection of subjects was that the chronological age of the children must be such that they were eligible for admission to the first grade following the year of intervention.

Since the children entered the regular school grades in the fall following the intervention period, there was a crisis aspect to the teaching-learning situation. It was assumed that these children from unstimulating environments had not had the opportunity to develop basic school readiness through the incidental learning available to more advantaged children. Therefore, in this one short year of opportunity, the learning situations had to be precisely structured so as to promote more rapid growth in affective and cognitive development. In addition, the class schedule had to be arranged to utilize each minute of the children's attendance to a degree greater than is the case in a typical kindergarten.

The goals for the developmental curriculum were diagnostically evolved through continuous, interpretive observations of the children enrolled in the experimental classes. The substantive curriculum goals

were evolved through diagnostic analysis of pre-enrollment test data and child and class observations. Individual charts were made for each child in the experimental group, listing the total test scores on the Stanford Binet, Peabody Picture Vocabulary Tests, and both vocal and sub-test scores on the ITPA. Horizontal inspection of these charts made it possible to identify individual specific strengths and deficits.

The next procedure was the construction of a chart for the total experimental group recording the same test score. A vertical review of this chart revealed deficits common to the class and provided a basis upon which to group the children for instruction.

The diagnostic study of the children in the experimental groups each year revealed the same types of deficits in functioning and development that have been found by other research works in the area of cultural deprivation. Therefore, the curriculum objectives of the present study were to stimulate growth in the areas of language and cognition, number concepts, time concepts, fine and gross motor development, visual and auditory preception, socialization, self-concepts, attention, concentration, and esthetic values.

Developing classroom procedures designed to reach these goals was a responsibility shared by the curriculum committee and the experimental teacher. During the first semester of the first year of the project, the diagnostic test data for each of the children in the experimental group were withheld from the teacher. This meant that any work on the substantive curriculum was independently planned by the teacher, based upon her observations of the children. She received direct guidance from the staff concerning socialization problems--an aspect of the developmental curriculum. The committee regularly reviewed the socialization goals and the observed behavior of the children as it related to them and activities were planned which might lead to improvement. Socialization problems of individual children were handled in a similar fashion. Informal direction was given to the teacher during this period by a senior staff member. This also made it possible for the teacher to discuss her plans for the substantive curriculum. This procedure was followed in order to lay the appropriate foundation for a language strategy research project that was initiated at the beginning of the second semester. Beginning with the second semester of the first year of the project and continuing for the next two years, the cooperative development of specific lesson plans by the curriculum committee and consultants was a regular activity.

It is important to note the process through which the daily lessons for the experimental group were developed. Instead of reviewing typical kindergarten activities and then looking to discover which, if any, of the curriculum goals might be implemented by the activity, the goals were first reviewed. Only then were activities planned for their implementation. This procedure helped to ensure the teacher's awareness of the why of an activity rather than emphasizing the exercise as an entity in itself. It also permitted reinforcement of specific learnings through ancillary activities throughout the day. Actually, many of the activities chosen through this process were typical of traditional

kindergartens, but the approach used here enhanced the effectiveness of the activity because of the intensity and depth of the teachers' involvement.

The equipment of the experimental classroom included materials found in most preschool classes, such as educational toys and instructional supplies. In addition film strip and movie projectors, a record player, and tape recorders were included. All of these materials were also provided for the KC group. An interesting addition to the EPS 1 and 2, but not the KC classrooms was made by students from the art education department at Indiana University. They drew and painted rather striking murals on the walls which provided excellent reference material for work with color identification and recognition of basic forms.

Program Scheduling

The curriculum committee worked closely with the class teacher in planning an effective distribution of activities in the program. These class programs were flexible, but the basic principles of using times of the day when the children were most alert for the most formalized instruction, and providing a balance between quiet activities and action situations were always observed. Also, even though a period was designated as snack time, lunch time, free play, or recess time and so perceived by the children, these periods were thoughtfully used by the teacher (and, after the first year, by teacher aides) as valuable opportunities for ancillary activities relating to the main objective for the day's specific lessons.

A representative sample of a daily class schedule follows: Class Daily Schedule--sample taken from the third year experimental group

9:00-9:30	Formal Language Lesson
9:30-9:45	Directed Activity (practice following language lesson-- self-help activity, working with puzzles, coloring work)
9:45-10:00	Snack Time (placed early in the morning because many of the children came without breakfast)
10:00-10:20	Story of the Week
10:20-10:40	Gross Motor Activities
10:40-11:00	Formal Motor Lessons (fine motor activities)
11:00-11:10	Sharing Time (ancillary language)
11:10-11:30	Directed Play (purposeful participation and leading on part of teachers)
11:30-11:45	Music (ancillary language)
11:45-12:00	Clean up (getting ready for lunch)
12:00-1:00	Lunch (wind-up of the day's activities)

Teacher Training

At the inception of the study, the project staff recognized the importance of the teacher variable. No attempt was made, however, to select teachers possessing teaching skills that had been specified a priori as required to implement the educational program for the experimental groups of the study. Rather young, well trained but inexperienced people were

selected and the project staff assumed the responsibility of providing the special training required. The design of the study did not include any direct training of the teachers for the kindergarten contrast groups.

In addition to well established principles of good teaching, the investigators believed that the teachers had to be trained in a diagnostic approach and infused with the urgency of compensatory education. Therefore, it was essential that the teachers be child oriented rather than content oriented; the utilization of each teachable moment had to be insured; introduction of new concepts had to be demonstrated as well as verbally explained to the children; skill had to be developed in providing concrete reinforcement and/or social approbation for individual children's responses at the appropriate time; and evaluations of individual children's performance in any activity had to transcend more global evaluations of total class response.

As could be expected, the teachers varied in personality and teaching style. Thus the strategies used by the project staff varied to some extent from year to year. However, certain procedures were found to be generally effective.

In order to assist the teachers in focusing their attention upon the children rather than the content of a lesson, the children's deficits or developmental needs were considered first then activities were planned to develop or remediate these deficits. For example, the goal of improving visual discrimination began with a review of the developmental sequence of visual discrimination, followed by identification of the performance level of each child, and then the structuring of appropriate learning experiences.

The techniques which were employed to insure use of each teachable moment during the day included verbal explanations, directed observations of the children, and role playing by the teacher with certain members of the curriculum committee. For example, the formal language lessons for a particular week involved polar concepts of big-little, tall-short, fat-thin, etc. Thus, the story of the week which was selected was Tom Thumb to provide reinforcing opportunities for the polar concepts of tall-short, big-little. The snack food was regular sized soda crackers and small cheese crackers. Through structuring these experiences, the teachers were led to recognize and to develop additional planned opportunities for learning the concepts. Another example of structuring situations to improve the use of teachable moments was the management of the free play periods. In these situations the teachers learned to involve themselves in play activities with the children in order to extend language experiences, to reinforce formal lesson goals, and to elicit more imaginative play.

Role playing with the teacher to discover appropriate techniques for the introduction of a concept or an activity was sometimes helpful. For example, if the task was to color a circle, the teacher had to demonstrate the task to the children rather than merely to ask the children to color a circle.

Appropriate use of concrete rewards for specific responses of the children must be perceptively used and require ingenuity on the part of the teacher. The process was demonstrated by a staff member, role played by the teacher, and then used in the classroom. Staff observations were made to insure that the rewards were being properly administered.

Two strategies were used to improve the teacher's diagnostic evaluation of the children's performance. One approach was the use of a chart containing the children's names, the major curriculum goals, and a check list containing an evaluative scale describing the degree of deficiency in each area of behavior. These charts were checked once a week with the curriculum committee. These observation charts are shown in Appendix A. Another approach was including on every typed lesson plan a space for recording individual and group responses to that particular lesson. (See Appendix B.)

To summarize, through the interaction of the curriculum committee with the teacher, it was possible to implement the diagnostic curricula with varying degrees of success. The weekly sessions included diagnostic study, formulating specific lesson plans, and evaluation of progress. The techniques of role playing and demonstration proved to be valuable approaches in improving the teacher's effectiveness.

Social and Emotional Development. The present authors realize that the children who were recruited for the study, both in the KC and the EPS sub-groups, were severely disadvantaged youngsters. Home backgrounds were deplorable in almost all cases, and visiting experts have repeatedly told the investigators that they were working with as true a sample of the "hard core poor" as could be found in the United States. All their own impressions are that this is the case, and the objective demographic data reported earlier bear out these impressions.

Thus, the assumption was made that children involved in the study would be, by and large, fearful and insecure, high in anxiety, low in curiosity, short in attention span, indiscriminate in perceptual habits--in short, would possess all the characteristic that have repeatedly been ascribed to severely psychosocially disadvantaged youngsters.

Further, the authors made the developmental assumption that all children basically need attention, affection, environmental predictability, friendly but strong and consistent authority figures, new experiences, and techniques for making social adjustment easier (gaining satisfaction from peers and adults).

The task of demonstrating the possible superiority of a diagnostically based curriculum over a regular kindergarten program was made more difficult by the fact that both the experimental and traditional kindergarten were based on a sound developmental orientation. The burden of proving the efficacy of one approach over the other thus depended mainly on whether specific diagnostic insight, consequent planning for individual children, and an emphasis on substantive teaching in the experimental class resulted in better learning for individual children within that

class. In other words, the effectiveness of a diagnostic curriculum depends both on the accuracy of diagnosis and the potency of the remedial teaching compared with a more general developmental curriculum.

However, certain differences in the developmental aspects of curriculum for the EPS and KC groups are depicted in the following paragraphs. Commonalities have already been described. They include operations for each of the assumptions given in the paragraphs above. For example, in neither group did the teacher ever rush into the substantive curriculum. For each year of the investigation (Study I, Study II, and Study III), about six weeks at the beginning of the school year--the socialization phase--were set aside for the children to learn to accommodate to and cope with their teachers, the testers and observers, and themselves. Overt affection manifestations were gradually introduced. At first, many of the children resembled little wild animals, cringing when adults came close or extended a welcoming hand. By the end of six weeks, their behavior resembled that of normal preschool children everywhere, although it was more intense in open attention- and affection-seeking behavior. The children seemed to be particularly hungry for contact with adult males to the degree that, during the first year of the study, the male investigators were hardly able to carry out their research and advisory functions because of the demands made on them by the children whenever they made an appearance. For such reasons, early in the school year for Study II and at the beginning of the school year in Study III, male assistant teachers were employed. The investigators' clinical judgment is that this innovation was highly productive.

Social Development. Firmly, politely, and consistently during the first part of each school year, the children were taught to take turns, to call their teacher and her aide by their names rather than "Teacher," to brush their teeth after meals, to clean themselves and wash their hands after toileting; to answer questions in complete sentences; to use "Please" and "Thank you," and so on. Discipline for both the EPS and KC groups was mild reprimand or "Time out." Physical discipline, other than gentle restraint for an occasional out-of-control child, was never used.

More for the EPS than the KC groups, tangible rewards were used copiously during the early part of the school year. These were always accompanied by verbal rewards such as approbation, praise, expressions of appreciation and, when the children came to the point where they welcomed physical contact, physical gestures of reassurance and affection. This was a loose application of "behavior shaping" and "conditioning to secondary reinforcement" theory and practice. It seemed to be very effective, as the demand for tangible rewards diminished to almost nothing by the end of the intervention year.

The investigators and others associated with the study made regular observations of the EPS groups. In this sense, the development curriculum was more diagnostically based for the EPS than for the KC groups. Illustratively: Sandy, a handsome little boy when clean, was psychiatrically diagnosed as passive aggressive. (Actually, he was not a very good little boy, so that the investigators wonder a little about the

"passive" modifier of the "aggressive" diagnosis.) Sandy consistently interrupted story times, circles, and other group activities that demanded quiet and attention by such activities as taking off his shoes and tossing them into another part of the room. The teacher's "solution" was to ask him to retrieve his shoes, then to draw him closer to her, gently restrained in one arm while she continued the business of the group. Observation soon made it evident that what she construed as a mildly disciplinary restraint was, from Sandy's point of view, strong reward. He was enclosed in a loved figure's arms, singled out for attention, warm and secure. His disruption pattern was thus actually being consistently reinforced by the teacher. Change to a planned schedule of ignoring disruptive behavior but administering "cradling" following constructive behavior produced positive modifications of his group behavior.

The developmental curriculum was similarly tailored for all children in the EPS group for all three studies. The investigators believe that great progress was made with all children in personal-social adjustment during their intervention year, and that this progress should have been greater for the EPS than for the KC groups.

Other aspects of the developmental curriculum that apply equally well to the substantive curriculum were planned experiences in developing non-cognitive aspects of individual and group behavior. Training was given in such behaviors as listening, planning, concentration, delay of gratification, and working for the satisfaction of working. Appropriate patterns of reinforcement for such behaviors were worked out for each child, for special subgroups, and for the total group. The following illustration demonstrates group training for listening, concentration, and delay of gratification: Initial "impositions" of silence were literally momentary. To develop group attention behavior, the teacher would say, "Let us see if you can all be quiet for one second." A tangible reward (sometimes candy but more often one of the niblet cereal products available on the market) was then dispensed to all children in the group who had achieved the goal. The silence time was slowly but consistently made longer and, within a few weeks, the children (while certainly not overconforming) were generally quiet and receptive when the teacher judged it necessary for purposes of instruction.

Similar training in delay of gratification was administered, for example, by rewarding the children for waiting to eat until all children and adults at their table were assembled. Serving time was used to further the purposes of both the developmental and the substantive curricula. It was a time of pleasant teacher-server and child interaction, based on what the investigators facetiously referred to as gut level motivation. Conversation included identifying all the foods that were served, differentiating beverages from solids, vegetables from meats, raw or green vegetables from cooked or yellow vegetables, small portions from large (and later, half portions from whole, one-third portions from one-half), and so on. It was also used to reinforce language use in terms of complete sentences, modifiers, and dependent clauses. Thus, serving and meal times played an important ancillary language development role, as is discussed later. Similar adult-child interaction accompanied meal-time at the tables where adults were sitting (typically,

at two of the three tables).

Another aspect of the developmental curriculum included conforming to the rules of the elementary school in which a particular group was located. Very early in the school year and as a first field trip (following orientation to the classroom), the children learned about the school as a whole by touring the different rooms and buildings. As soon as they were well enough oriented and judged to be sufficiently personally secure, the children also learned to run the types of errands to different rooms or parts of the school that are a part of school life in any part of the United States.

Emotional Development. Basic principles of buttressing these children's initial rudimentary and distorted self concepts have been discussed earlier (as a part of the developmental curriculum). The authors believe the procedures were rather successful for most children. As already indicated, many of these procedures were common to the Experimental and Kindergarten Contrast Groups. A secure, affection-filled, clearly-structured, and consistent therapeutic atmosphere was the aim for both groups and seemed an appropriate setting in which to accomplish not only the personal-social but the substantive-didactic skills.

Accuracy and Differentiation. In this section, the authors turn to the more formal procedures for self-concept training. These were designed both to develop a clear, well-differentiated, and adequate self concept, and were more systematically used in the Experimental than in the Kindergarten Contrast Groups.

Colored photographs of all children were taken early in the school year and attractively mounted. The teacher then made sure that each child could identify not only himself, but every other child in the group. The ability to match a picture with a given child would then be followed with learning the first name of each person in the room. A sizable proportion of the children did not recognize their own pictures. They often showed a mixture of delight and dismay with their pictured image.

A full length mirror was introduced and maintained throughout the school year to help the children develop their own body concepts and to assist them with grooming. A mirror was also introduced as a part of a "dressing table," at which the children brushed teeth and hair, or manipulated collars and other external aspects of their dress.

"Guess Who" was a frequent game: "I am thinking of a girl with brown hair and blue eyes who is wearing a pink dress." As a general rule, the children were far more accurate in recognizing others during this game than they were in self-recognition, although after a few weeks of the game all children mastered self- as well as other-references.

Further formal instruction in this area consisted of drawing silhouettes of themselves and others, recognition of these silhouettes,

and recognition of silhouettes with parts missing. Considerable experience with small figure drawing was also given. A "Muscle Club" was developed for the boys, which served the combined functions of "brotherhood," recreation, prestige, outlet for energy, development of gross and certain fine motor skills, experience in following rules, and self-inhibiting behavior. At first restricted to boys, it was later found that this Club appealed as well to some of the girls, who were welcomed into its ranks. It also served as a valuable ancillary language activity.

A general strategy used throughout the EPS classes was that of regular reviews with each child of concrete examples of his work. During these reviews the objective was to help the child see the kinds of improvement he had made and to reinforce his efforts directed toward the achievement of more sophisticated techniques and products.

Language Development¹

The Ss were conspicuously deficient in language behavior. Since concept formation and reading readiness cannot occur efficiently without adequate oral language, one of the major goals for the preschool curriculum intervention was to develop richer and more effective language.

Two basic developmental strategies were employed throughout the investigation: a daily formal language period consisting of structured diagnostic language lessons; and a series of ancillary language activities designed to reinforce the lesson objectives and provide opportunities for transfer of language skills.

The Formal Language Development Program. The language lessons used for experimental children were (1) designed to develop the children's elaborative language. (2) built upon the children's level of language skill as diagnosed by the Illinois Test of Psycholinguistic Abilities (ITPA) and (3) programmed for complexity according to the development shown by the children, as judged by the teachers.

By the time their kindergarten experiences had begun, a majority of the children had learned a restricted language code by means of which they were able to communicate their needs and understand simple verbal instructions. However, they were, in general, unable to cope with elaborative language as described by Bernstein (1960). For example, they were typically able to give the generic label, "chair," to a rocking chair, easy chair, or straight backed chair; but could not provide the differentiating labels, "rocking," "easy," or "straight-backed." In addition, they could not compare or contrast such chairs with respect to size, shape, color, texture, or multiple function. This elaborative language deficit was further demonstrated by their performance on the Binet. The project children did least well on those items which involved somewhat prolonged speech sequences, and best on those items in which the verbal stem and response were short.

A related problem was discovered by an item analysis of the initial Peabody Picture Vocabulary Test (PPVT) protocols of the total study sample. A rank order correlation of .71 between the order of difficulty

¹The authors are indebted to Dr. Keith Sterns for his assistance in preparing this portion of the report.

for the entire study sample of five year olds and the placement of these items in the test was obtained. Gerunds such as yawning, tying, picking, building, pouring, sewing, catching, were much more difficult for the project children than for the standarization sample. Labels for uncommon objects or things seldom encountered in their familiar environments, such as dial, caboose, peacock, and eagle were also more difficult for the project children. The same phenomenon was observed by John and Goldstein (1964) with four-year-old lower class Negro children in New York City.

Because it was assumed that elaborative, representational language is necessary for the development of symbolic thought, verbal mediation, and later school success, the language lessons and ancillary language activities were designed to elicit elaborative language and to reinforce its use whenever possible.

Language Lesson Development, 1964-65. During Study I, the language development aspect of the curriculum was organized by Stearns (1966) as a sub-study of the larger investigation. The teacher of the EPS group was provided with a series of 67 diagnostically derived language lessons which she used during the second semester of the academic year. Before the structured language lesson series began, the teacher was given no diagnostic information about the specific language strengths and weaknesses of the experimental preschool group. Although structured language lessons were not used during the first semester, many of the ancillary language activities described later had been employed by the EPS classroom teacher.

In developing the language lessons, Stearns attempted to meet two objectives. The first was to develop a pattern of language development based on the observed linguistic deficits of individual children in the EPS group. The second objective was to improve elaborative language according to linguistically derived theories of language structure and use.

The pattern of instruction was such that the classroom teacher worked with teacher-pupil ratios typical of those found in special classes for educable mentally retarded children (i.e., one teacher to 15 students).

The ITPA was used as both a diagnostic and as an evaluation instrument. Ss selected for the main study were administered the ITPA as a pretest at the beginning of the intervention year, as a mid-term examination for additional diagnostic and evaluation purposes, and as a post-test at the end of the year to evaluate the effect of the program.

To conserve instructional time, Ss with similar psycholinguistic deficits were first grouped for instruction on the basis of their pre-test ITPA evaluations. It was assumed that, although there would be overall increases in total language age at midyear, the pattern of strengths and weaknesses would remain constant.

Inspection of the individual profiles obtained from the ITPA pre-tests indicated that the majority of the children had a characteristic profile marked by deficits on language expression (Vocal and Motor

Encoding--ability to express oneself in words and gestures respectively). They were relatively strong in language understanding (Visual Decoding--the ability to understand what is seen,--and Auditory Vocal Sequencing--auditory memory). Therefore, the first 15 lessons were developed on the assumption that the primary remedial focus should be on expressive (encoding) language. The observed strength of the group in language understanding when visual stimuli were presented led to a strategy of eliciting oral responses from visual stimulus materials.

Analysis of the individual profiles for the mid-term test was completed during the presentation of the first 15 lessons. Examination of the group and individual profiles indicated that the assumption that the general pattern of strengths and weaknesses would remain the same from the first testing to the second was untenable. General gains had been made during the first semester of the intervention year. The greatest gains had been made on the subtests measuring attention span (sequencing) and expressive (encoding) language. This resulted in a flattened profile. Re-examination of the individual ITPA protocols suggested that the strategy of grouping children on the basis of similar linguistic disabilities was no longer feasible in the context of classroom instruction. It would have required the teacher to organize five different instructional groups. Observation of the class suggested that two language instructional groups represented the optimal instructional grouping.

Observation of the groups during language instruction, as well as the teacher's evaluations of the children's performance, provided a logical basis for grouping. Subjects in the experimental group could be divided into two groups based on the teacher's estimate of vocalization during language lessons. The first group was characterized as a high-vocal group. Often, individuals classified by the teacher as high-vocal dominated the group in which they worked during the language lessons. The teacher described these children as being those who "overpowered" the other members of the group during language instruction. The second group was labeled as low-vocal. These children were passive participants in their particular language instruction group. This finding has important practical implications for kindergarten and elementary school training in expressive language. High-vocal children tend to monopolize group free-verbal activities so that opportunity to learn is lost by low-vocal children.

After re-constituting the groups on the basis of high- and low-vocal behavior, the ITPA profiles were re-examined. The high-vocal group presented a pattern of few extreme psycholinguistic deficiencies. Although their overall language ages were all below CA, their total ITPA language ages were above four years seven months, and the children generally presented profiles with only one or two areas of significant weakness. Members of the low-vocal group typically presented profiles with significant weaknesses on three or more sub-tests, and had total ITPA language ages below four years seven months. The mean expressive language age (Vocal Encoding) for the high-vocal group was 66 months, and for the low-vocal group was 51 months. When the criteria of maximum child participation in the individual lessons and minimal classroom management problems were used, this instructional grouping strategy proved to be extremely successful. During Study II and Study III, the same language instruction grouping was

used equally successfully by the teachers.

After these groups were formed, the low-vocal group was given an instructional core that stressed expressive (encoding) aspects of psycholinguistic skills. Instruction for the high-vocal group called for skills that went beyond the expressive language tasks required of the low-vocal group. This included stress on tasks requiring such skills as represented by the association and attention-concentration (Automatic-Sequential) ITPA subtests. An attempt was made to individualize instruction by providing the teacher with specific directions for working with individual children. These directions were based on the individual's psycholinguistic disabilities as indicated by his mid-term ITPA results, the child's responses to the language lessons, and the teacher's observations. Experience with individual children at times suggested changes in grouping or a need to shift to individualized instruction.

Three methods for developing elaborative language were incorporated in the language lessons: response elaboration, verbal definition, and verbal feedback. Two methods were used to stimulate response elaboration. The first involved the labeling activities present in many of the lessons that focused on expressive language. The method included three steps. In step one, the children labeled or named the object. At this level, a child was required only to provide the name. Step two required him to improve the quality of his response by identifying the salient features of the object that he was labeling. In step three, he discriminated vocally between similar objects on the basis of structural or functional characteristics, and categorized apparently dissimilar objects according to some common feature.

The second method for developing response elaboration dealt with the length and completeness of verbal responses. Through feedback, direct questions, and supplying a model response, the teacher attempted to build from one word responses and sentence fragments, to complete sentences. This procedure was also followed for tasks that required a visual-motor response to complete a picture story.

Verbal definition was incorporated in all lessons. Church (1961) believes that the concrete devices frequently used in education are of little value if a student does not verbalize what he is witnessing, both its meaning and its relationship to other things. This procedure was incorporated as a major aspect of the curriculum. Teachers were instructed always to supply the child with the correct response and talk through any activity in which they were engaged.

Two forms of verbal feedback were used. The first was to give a modified feedback of the child's response. Behind this procedure lies the assumption that verbal feedback of the child's response is a potent social reinforcer. Second, corrective feedback as employed here provided the children with a model of an appropriate response, but at the same time avoided a negative statement in identifying the incorrect response. For example, if a child labeled a cow as a "Moo moo," the teacher responded, "Yes, that is a cow, and cows say Moo, moo."

Language Lesson Development, Study II (1965-66). Response elaboration, verbal definition, verbal feedback, and the psycholinguistic assets and liabilities assessed by the ITPA continued to provide major guidelines for the language program in Study II. In the words of the teacher, "In all the language lessons, the children were encouraged to touch, taste, feel, hear, smell, and see whenever possible. In this way they get as complete a concept as possible about what they are studying. The lessons always begin with the known and move to the unknown, and review is provided in every lesson. In this manner, the lessons incorporate several well-known learning principles.

"The long-range goal of these language lessons is not just to teach these children vocabulary. It encompasses much more than that. The lessons teach similarities and differences, sharpen the observational powers of the children, and give the children the experience of hearing English correctly spoken in sentences. These lessons teach the children to observe, to question, to discover, and to think. The children are . . . learning how to learn."

The summary above was written by the teacher within 10 weeks after the beginning of the academic year. It clearly illustrates, although not in the formal language of linguistics or learning theory, the basic principles of the Study II (as well as Studies I and III) language training, whether formal lessons, or the ancillary language activities described later.

The Study II language program differed in certain major ways from that of Study I: (1) A reservoir of formal and informal experiences with children of this socio-cultural-intellectual level had accumulated (the type of nomothetic data any teacher or research worker gathers about the population with which he works). (2) The investigators believed the previous year's lessons had been too fragmentary in that they lacked continuity from one lesson to another or from formal lessons to ancillary activities occurring during the remainder of a school day. (In Study II, continuity was better attained by embodying the lessons in units that related to other on-going class activities.) (3) In all probability, the language lessons of Study I may not have been sufficiently based on the children's previous experiences. (In Study II, the authors tried to introduce the new by using and consolidating the old and familiar.)

Otherwise, the basic principles were much the same as described for Study I. Experimental children in Study II were given almost twice as many formal language lessons as the Study I children. These lessons began as soon as the socialization period was complete (about six weeks after the children entered school).

The beginning of each lesson was used to check what was known by the children and to consolidate previous gains made by them. Old words and concepts were related to new ones, which were added in a context made partially familiar by including in it a majority of familiar words and concepts. Time orientation was also provided by review and transition activities. Discriminations and generalizations were interwoven with games and familiar objects, such as the "chair game" which is described

below. This was part of the house unit, which in turned flowed from the farm unit. The teacher and assistant teacher not only served as models but through a variety of techniques established themselves both as primary reinforcers by dispensing niblets and candies, and secondary reinforcers by giving smiles, approbation, and physical gestures of affection at appropriate times. Elaborative responses were elicited by questioning each child in depth. Generalization was encouraged by introducing a familiar teaching aid (the play TV) into a unit on houses. Advantage was then taken of the children's spontaneous relating of the "Story of the Week" (to be described later) through the medium of the TV which had already been related to the unit.

The method of forming the language groups for Study II was similar to the high-low vocalization grouping procedure developed for Study I. All children placed in the low group had scored below the four-year-old language age level on three or more subtests of the ITPA. Children placed in the high group had scored below the four-year-old level on only two or fewer ITPA subtests.

As has been stated, individual language lessons were built into a series of units, starting with farm animals and progressing to different rooms in the house, fruits, vegetables, dairy products, and other topics that could be easily exploited using local resources. Care was taken to provide transfer and transition from one unit to the next and to provide a review whenever possible.

The following description illustrates how the general principles were applied in Study II as well as some of the problems.

Following a four day unit on farm animals, a transition from that unit to a living room unit was made in the following manner. The lesson began with a review of the earlier description of a dog. Next, pictures of a house and barn were shown and the children were asked to identify them and to decide which one the dog would like to live in. They were then asked why the dog would like to live there. Next, they pretended that they were visiting in a house, discussing how they would go about finding whether there was anyone at home. When they knocked on the door, the teacher invited them in and they sat down in the living room. At this time, the high group discussed the furniture found in a living room.

It required two days to complete the next lesson. On the first day, entering the house and going into the living room were reviewed. "Living room" was a new concept for all the children, and the closest they could come to the concept was "front room." During the rest of this language session, various pieces of furniture were named and described. The description the first day was so complete that the group did not get around to all the common types of living room furniture, so the topic was continued into the second day. The high group remembered the word "cushion" from the previous day, but the teacher had again to supply the term "lamp-shade." After the first description, the objects were again presented, and function was asked for as well as description. Neither the high nor the low group had difficulty with the function of the pieces of furniture.

The next lesson dealt principally with the mock TV and the story of the Gingerbread Boy referred to above. This lesson began with a review of names and descriptions of the various pieces of furniture. The TV was the last item named, and the teacher then held up the mock TV. The low group did not recognize it as a TV until it was "turned on," but the high group recognized it at once. After the TV was "turned on," the teacher placed the first picture of the story in the mock TV and sat in silence. The children were asked what was missing from the TV; only the children in the high vocal group correctly indicated that it needed sound. The children were told that they would have to supply the sound by telling a story about the pictures shown in the TV. The story need not have been the actual story of the week, but in this instance, it was. They had no trouble with this new way of story-telling, and seemed to enjoy it keenly. It fitted well into the previous farm unit, since a horse and cow were among the characters.

The next lesson attempted to teach similarities and differences among different types of chairs. When the children came into the group for the lesson, there was a different type of chair for each child. The first thing they were asked was to name what they were sitting in. Then they stood up and looked carefully at their own chairs and those of their neighbors. Both groups immediately recognized that the chairs were all different. They were then led into a discussion of how the chairs were alike, and again all children in both groups knew that the chairs all had four legs, a back, and a seat. Each child was then asked to bring his chair to the front of the group and describe it to the rest of the children. The high group managed this well, and needed to be supplied with only the words "metal" and "wood." The majority of the low group, however, had to be coached with leading questions. Interest was good for both groups for this lesson, although it involved too much movement for the low group and the children became distracted. On the second day of the lesson, the chair game was played. This is a memory game in which the children all face the wall while one of the chairs is placed in the center of the circle. They are to tell both whose chair it is and describe how they were able to tell. Interest was good in the high but poor in the low group, again because of their easy distractibility and the amount of movement involved in the game. In the high group, the children verbalized rather well how they knew the chair belonged to a given child, although they needed help with fine discriminations. The low group typically said the chair belonged to X because it was the chair he was sitting on. The high group finished the game first, and the children were given pictures of chairs to hold and described to the group. They gave good descriptions of the chairs, but interest began to lag near the end of the lesson.

Language lessons for the rest of the year followed this general pattern.

Language Development, Study III (1966-67). During Study I (1964-65), heavy emphasis was put on specific psycholinguistic process and channel development, as described by McCarthy and Kirk (1961). The first consideration in developing the sequence of activities was the nature of the language deficits for each child. The stimulus materials selected for the

lessons were those that the experimental preschool teacher and the investigators assumed had the greatest motivational value for the learners. While psychosocially disadvantaged children are known to be generally deficient in language, their language is relatively adequate when it deals with their familiar life environments. For this reason, only minor attention during Study I was paid to consolidating language usage that concerned the children's everyday living. In other words, no systematic attempt was made to introduce the group to the names and classes of various objects such as animals, fruits, furniture, and other similar objects. This was done only when such objects were judged to have high stimulus value or were related to other activities in which the children were engaged.

During Study II, the focus of the language curriculum was changed to provide for systematic incorporation of such familiar concepts into the children's language repertoire. Thus, object identification was developed in a sequential manner through highly structured basic language formats. Progressively, the group was provided with lessons centering on various foods, household items, and identification of family and community resources.

Profiting from the first two studies' procedures and results, the stress of the language development curriculum was altered for Study III. Two correlated language development programs were developed, each in two phases. Response elaboration and verbal feedback continued to be extensively used in presenting individual lessons.

Phase One: It was initially planned that phase one of the Study III language development curriculum would comprise the total language development curriculum for the year. It was assumed that, through careful study of individual ITPA protocols and analyses of teachers' comments concerning the previously developed lessons, a format of language instruction could be developed that would include the strongest aspects of the curricula of the preceding years and at the same time be diagnostic in nature.

Accordingly, a series of new lessons was developed that centered on the thematic approach of Study II. In addition, the lessons incorporated the expressive language and concept formation elements included in the lessons from Study I. Previously developed lessons were reviewed and incorporated in the new sequence of lessons where appropriate. This approach was by no means an unqualified success.

Three factors--teacher acceptance of the lessons, teacher implementation of the lessons, and sharpness of lesson focus--were responsible for the failure of the phase one language program. Teacher acceptance of the lessons was poor. The lead teacher commented repeatedly that they were non-directional and too conglomerate in approach. She also believed they lacked challenge for the high vocal group (i.e., the lessons appeared to be providing practice for previously developed skills while failing to develop new skills). She considered the lessons effective with the low vocal group only because their language patterns were so deficient that any type of language approach would be beneficial. Further,

the observers reported that the teacher conducted the lessons on a purely technical-mechanical level. She apparently viewed each lesson as an isolated unit to be presented without reference to previous or future lessons. Lessons were presented as if they were a precise script which must be followed without an adaptation to the learner's response. It was also difficult for the teacher to understand and apply the basic rationale of the language curriculum to the ancillary language activities that occurred during the typical preschool day. Thus, the lessons were judged to be inadequate, since they failed to fit the teacher's criteria for face validity. This factor, coupled with unsuccessful communication of the rationale of the language development program to the teacher, may explain her mechanical handling of the whole language curriculum.

The individual lessons were also too broad and included too many complex objectives within a single lesson. For example, one series of lessons introduced the names of various fruits so as to increase the labeling vocabulary of the children. At the same time and with the same group of lessons, an attempt was made to extend the use of descriptive adjectives, categorize the fruits by different classes, and stimulate the children to use complete sentences when describing the fruits.

Phase Two: Based on the teachers' comments and the observers' reports, the orientation of the language program was changed at mid-year. This reevaluation resulted in an approach that was communicated to the teacher as a plan of language strategies to be employed for all language occurrences during the school day. The revised language approach was directed at (a) detecting and correcting language disabilities; (b) introducing the basic structure of expressive language to the learners; (c) making basic language structures habitual for the learners; and (d) using the basic language structures to deal with naturally occurring environmental events.

For such reasons, a series of psycholinguistically oriented teaching strategies was developed to replace the lesson plans. These strategies were based on the McCarthy and Kirk (1961, p. 5) psycholinguistic model. They served to provide the teacher with an instructional format that would facilitate identification of the children's specific language deficit areas. The teacher strategies were viewed as universal lesson plans sufficiently flexible to make it possible for the teacher to vary the difficulty level of a given lesson whenever necessary. They also gave the teacher the opportunity to select different stimulus materials to coincide with the core of other classroom activities. Individual deficit areas were pinpointed by the quality of children's responses to a given strategy.

The simple auditory discrimination (Auditory Decoding) format shown in Table 12 provides an illustrative example of the psycholinguistically based formats. While each format emphasizes the development of a major psycholinguistic area, other language activities are included in the format. For example, the first activity in the auditory memory (Auditory-Vocal Sequential) format required the children to provide verbal descriptions of a bell and a drum. This was a necessary first step for the child to communicate the sequence of sounds to the teacher. In the same manner,

Table 12

Auditory Discrimination (Auditory Decoding) Lesson Format

(This format should be used prior to the auditory memory format. The materials incorporated are suggested materials. Some of the materials used will be used in the auditory memory format.)

MATERIALS: rhythm instruments which will produce a wide range of sounds for gross and fine auditory discrimination: piano, bell tones, etc.

BASIC TASK	ALTER DIFFICULTY LEVEL	CORRELATED ACTIVITIES
1. Select two objects which produce grossly different sounds (i.e., bell and drum). Present them to the class and use the basic identification format for naming the objects. Demonstrate the sounds which they make. Let the group members "try" them out. Discuss the differences in the sounds which the objects make (i.e., channel the discussion to use terms which you have previously taught the group, such as: loud, soft, high, low, same, different. 2. Have children close their eyes and sound the object twice. Ask, "Was it the same sound?" Encourage a unison vocal response. Feedback the response to the children and demonstrate to them while they are watching you. When you have a reliable response on same sounds then tell the children to listen carefully because you might try to feel them. Then vary the procedure by introducing different sound patterns (i.e., bell, bell, then bell, drum). If the children use the descriptive phrase, "different," feedback the response. However, also encourage the use of "It's not the same." Be sure to use complete sentences in your feedback and remember to supply children with the correct response when they are unable to respond. In feeding back the response, demonstrate the stimulus sounds and have the children observe this. 3. When the children can respond comfortably with the stimulus sound being made in front of them with their eyes closed, move the stimulus materials behind them and repeat procedure two (2) with the children having their eyes open and the sounds being made behind their backs. The response will be made by each individual child, but the other children should be alert to check the child's response.	At this level, the number of stimulus objects may be increased rather rapidly. In introducing a stimulus object, be sure the children are able to: a) Label the object b) describe it in some manner c) identify the sound when they see you use the object to make the sound (i.e., associate sound with label) The difficulty level may be increased by decreasing the difference between the sounds made. A high difficulty level would be telling differences in two sounds made on the piano or bell tones.	Take the children for a walk. Have them listen for differences in car and truck sounds, differences in bird sounds, etc. Music time: Play a familiar song that the children have already learned, but do not tell them the name. Let them guess the song heard. Voice identification game: Have the children guess each others' voices by having different children repeat a phrase such as: "Hello, how are you today?" The children should have their eyes closed. Game: "Doggie-doggie, Where's your Bone?" One child, acting as dog, sits on a chair with his back to the rest of the class. A block, or other object, is used as the "bone" and is placed under the "dog's" chair. The teacher points to a child in the room to come and take the bone from under the chair. The "dog" tries to decide who took the bone by listening for clues as to where the person walked from in the room, etc. Playground Activities: Listen for various sounds different equipment might make, such as the swings, teeter-totter, bouncing of a ball, jumping rope, running, etc.

discrimination necessarily precedes memory. Therefore, the sounds to be included in the auditory memory sequence are first taught to the child in the manner indicated by the simple sound discrimination format. This insured that, if the child was unable to recall the sound sequences of the auditory memory lesson, his failure was probably related to memory rather than to his inability to understand (decode) and express (encode) what he had heard. Similar methods were followed in developing other psycholinguistically oriented formats.

The strategy format also provided specific directions for varying the difficulty level of the task. This permits diagnostic teaching of any particular skill. Specific directions are provided for correlating the intent of the lesson with other activities.

Procedures for teaching basic structure underlying the English language were introduced during formal language periods. These procedures paralleled suggestions made by Bereiter and Englemann (1966). During this segment of the language program, stress was put on polar and non-polar discrimination (e.g., long-short, black-white, up-down) and the production of statements incorporating these discriminations.

The teacher was provided with many suggestions for making instruction more effective. Stimulus materials for lessons were selected that first grade teachers judged were familiar to all children entering formal school programs. Suggestions were also made about activities to supplement the specific language program.

Following this change of orientation, the teacher accepted the language program better. She characterized the children as "really getting what they needed" from the lessons. Observers reported that the teacher's approach to the lessons was much more flexible and spontaneous. It was also noted that the types of language task demands required during the language period were carried over into activities such as snack-time, recess, motor development lessons, and excursions.

Summary and Conclusions

This section has dealt with the mechanics and the rationale for the development of various aspects of the language development curriculum. However, it must be recognized that what has been described to this point is a group of organized language experiences. The success of any curriculum, no matter how theoretically sound and irrespective of its inherent stimulating quality for the learner, lies in its application by the teacher. In this connection, the following suggestions are useful. Any curriculum or its parts (as represented by the lesson plans) must have face validity for a teacher. That is, the rationale upon which the curriculum is based must be communicated to the teacher so that she can translate it into educational practice. Further, the curriculum must promote development in a direction worthwhile for the learners in the teacher's frame of reference.

If minimum standards of teacher acceptance are not met it is likely

that the teacher will implement the curriculum in a mechanical manner, analagous to the way she might complete the daily attendance roster.

Ancillary Language Activities

The basic strategies underlying the formal language lesson plans were also employed in ancillary language activities. The focus of attention remained on the goals and the children's goal-directed performances. These determined the selection of activities congruent with the objectives. This approach was considered important not only in insuring the appropriateness of the activity but also in promoting teacher sensitivity to the individual children's responses. Teachers were discouraged from depending on global impressions of the total group's response to activities.

Sharing Activities. The objectives of (a) stimulating more adequate ability to talk to a group; (b) encouraging better attention in group situations; (c) developing memory for ideas presented in group situations (all extremely important in improving school readiness), coupled with the observed deficiencies of the children in these areas, led to incorporating a sharing period in the daily program.

One important objective was to improve the ability to talk to a group. To this end, teachers encouraged the use of elaborative language. They were alert to the interest values of ideas reported, and tried to improve articulation and voice quality. A device intended to arouse interest and sustain attention was for children to reach into a large paper sack and on the basis of feeling the object to guess what the bag contained. One child would then take the object out of the sack and the others would take turns describing and naming it. The teacher encouraged elaborative language by asking about the properties of the object.

As part of the general objective of concentrating and remembering, a record was kept on the chalkboard of each child's contribution during a given day's sharing period. When each child had finished his turn, the teacher asked the children to recall what selected children had reported. It took several sessions to achieve appreciable success. However, the children were eventually able not only to recall experiences told by others on the same day, but also to recall reports made two days previously. In addition to stimulating attention and memory, the children gained a sense of importance and "self-origination" in hearing their ideas retold by others.

A record chart was introduced to help attain such objectives as recognizing interest values of ideas, improving articulation and voice quality, and improving listening attention. This also helped the youngsters to see concrete evidence of their progress during the sharing period. Several blank squares were placed beside each child's name. A simple set of rules was established. One square was filled in with colored ink each time a child (a) faced the group when reporting, (b) had something interesting to tell, (c) spoke loudly enough for all to hear, and (d) spoke clearly enough to be understood. This simple technique produced quickly visible improvement in each child's performance.

Story of the Week. A story time period was included in the program in order to extend the children's acquaintance with children's literature, to improve their ability to listen attentively to a story, and to develop skill in retelling a story in sequential order. It was assumed that these skills are part of what is meant by cognitive development. In Study I, the teacher followed the traditional procedure of reading or telling a different story to the children each day. The stories included fairy tales, folk tales, and other types of material familiar in children's literature. This activity was judged to be of limited value for this population. It was difficult to hold the children's attention, even with the use of illustrations. Little recall of the stories was demonstrated, either in terms of the ideas presented or the sequential order of events. Children failed to identify with either humorous or tragic situations presented in the stories and it was decided, therefore, to change the procedure and to use only one story per week. This came to be known as the "Story of the Week." The activities planned around this story were distributed throughout the week. These activities included the introduction of the story by the teacher, and a variety of follow up experiences such as showing a film of the story and the children retelling the story in sequential order, first through the use of cut-out pictures and then without the aid of pictures. The teacher would also tell the story incorrectly and ask the children to correct the faulty version. The teacher would read the story omitting certain words and phrases which the group supplied. The culminating activity for each Story of the Week was a dramatization of the story by the children. The repetition, instead of boring the children, apparently gave them a feeling of confidence through real familiarity with the tales. This modification of a typical kindergarten activity was found to be much more effective than traditional story periods in working with the present population of children. This incidental finding pointedly demonstrates that some widely accepted early childhood and children's librarian practices may be inappropriate for use with psychosocially disadvantaged children.

Structured Field Trips. The first formal language lessons were developed around a unit on farm animals. Here, ancillary language activities served as an introduction to, rather than a reinforcement for, the formal lesson. A farm trip was planned. This activity was carefully structured in order to provide an optimal learning situation. Two days were spent in preparing for this trip. First, the concept of farm animals was introduced to the children through pictures and plastic models of animals. Attention was called to comparison and contrast of size, shape, color, and so on. Records of sounds made by farm animals were played, and farm stories, songs, and games were introduced. It was then judged that the children were prepared to attend to and understand the things they would see on the farm. The physical arrangements for the trip included a child-adult ratio of four children to one adult. This insured ample opportunity to ask questions and discuss what was seen.

On this particular trip, the farmer was most cooperative and the farm rich in interesting things to see. The children were able to

be close enough to the animals--cows, sheep, chickens, horses--to see, feel, hear, and smell them. They saw a cow being milked and held a freshly laid egg in their hands. The post-trip sessions included films and discussions, and established the setting for the formal language lessons.

Snack and Lunch Time. Snack and lunch time were exploited to extend vocabulary concepts, and develop number concepts. On these occasions, either the class teacher or one of the assistants usually sat and ate at the tables with the children. This provided experience in using polite language and engaging in friendly conversation with an adult. Color recognition and taste discrimination were practiced by varying the color and nature of the juices served (e.g., apple juice, lemonade, grape juice, cherry juice). Size, shape, and number concepts were reinforced by offering a variety of snacks such as cookies, cheese crackers, and dry cereal bits. At times the children counted the number of snacks each child had or discussed their color, size, and shape. Though informal, this was consciously planned by the teachers. Lunch was served cafeteria style. As children presented their plates to the teacher, they were taught to say, "May I have some--(naming the food)." They also indicated whether they wanted a large amount or a small amount. As has been mentioned previously, snack and lunch times were also valuable activities for the developmental as well as the substantive aspects of the curriculum. Regularly scheduled staff observation during snack and lunch times revealed steady improvement in expressive language, and attested to the effectiveness of such ancillary language experiences.

Adaptive Art. Use was made of adaptive art to implement the basic objectives of the language development curriculum. For example, the familiar art experience of drawing a picture of anything the children wished became an ancillary language activity. The teacher would ask each child to tell her the story of his or her picture. The story was recorded for each child and kept in his folder. It was both interesting and depressing to observe the poverty of ideas and language in the early samples of this work, as well as the crudity of the drawings, but heartening to note the improvement that occurred as the activity was repeated.

The language objective of developing polar concepts was implemented through another art activity. While modeling with Play-Doh, the children were asked to make a short snake, a long snake, a fat snake, a thin snake, a round cake, a square cake, and so on, in great variety.

Vocabulary concepts were extended through art lessons providing experiences with a variety of textures. Through the use of sandpaper, silk, rough wool, velvet, fur, and plastic objects such concepts as smooth-rough, hard-soft, shiny-dull, were developed. Following each teaching session and using specific samples, the children were helped to generalize by locating objects in the classroom which had the properties of the samples.

Structured Free Play. Each year's program included daily periods officially labeled as free play. It was assumed that the children's concept of this time was exactly that--free play. However, each teacher used

this period to extend learning experiences. Expressive speech and imagination were encouraged in the following ways: when the children selected toys and began playing either alone or in small groups, the teachers got down on the floor and participated actively in the play. When the children chose to assemble puzzles, the teachers drew their attention to size, shape, color, and the picture which was taking form, as well as to a systematic search for the appropriate pieces to complete a puzzle.

Adaptive Music. Language curriculum objectives were also pursued during music. For example, memorization of nursery rhymes and familiar children's songs stimulated verbal memory and provided cultural background experiences heretofore missing for most of the project's children. The verbal directions imbedded in the musical games provided valuable experiences in understanding and following verbal directions.

Adaptive Physical Education. Many activities were included in the physical education program to stimulate elaborative language. For example, movements were accompanied by chant-songs such as "We are running. We are marching. We go under the table. We crawl over the boxes." This provided excellent reinforcement for use of action words, gerunds, and prepositions.

Motor Development

During the first year of the study, the Kephart Perceptual Motor Development Scale was used to measure the motor abilities of the EPS children. Advanced graduate students from the School of Health, Physical Education, and Recreation gave motor development instruction to the children during a daily 20 minute physical education period. On the basis of informal observations, it was concluded that the most serious deficits of the children were in fine, rather than gross, motor behavior. However, the Kephart scale was highly loaded with gross motor items, making it unsuitable for determining whether improvement in fine motor development had occurred.

To overcome the problems encountered during Study I, the literature was surveyed to locate an instrument to measure changes in fine motor development that possessed sufficient "bottom" for the five year old subjects. The most reliable test meeting these criteria was the Lincoln-Oseretsky Motor Development Scale (L-O). It was used for Studies II and III as a pre- and post-measure. Since the L-O does not include normative data for children below the age of six, raw score rather than age score comparisons among groups were made. To determine whether the motor development abilities of the project children were, as suspected, significantly below those of middle-class children of the same chronological age, the L-O was administered to a group of middle-class children of normal intelligence, equated in age and sex with the psychosocially disadvantaged children of the present study. The average total motor ability raw score for the middle-class group was 53, while that for the experimental children was 20. The mean fine motor scores for the middle-class and project children were 32 and 13 respectively.

Gross motor scores were respectively 20 and 7. All these differences favored the middle-class group and were statistically reliable.

Fine motor coordination is essential for such school activities as writing and arts and crafts, and gross motor skills are necessary for socialization activities (e.g., most formal and informal free play games, relay races, dancing). Therefore, a more concentrated effort to develop the motor abilities of the experimental children was made during Studies II and III. As in the case of the language program, a daily formal motor development period consisting of structured motor lessons was introduced. A series of ancillary motor activities designed to reinforce the motor lessons was also incorporated into the curriculum. These followed strategies similar to those included in the ancillary language section and therefore will not be discussed.

The Formal Motor Development Program. To determine the exact nature of the motor deficits exhibited by the children, it was necessary to determine the specific factors that make up motor proficiency. A review of the literature indicated that these factors had been identified by Guilford (1958), who had factor analyzed existing motor proficiency tests. His analyses indicated that motor skill consists of two major factors: fine and gross. The fine motor factor includes finger speed, arm steadiness, arm and hand precision, and finger and hand dexterity. The gross motor factor includes static balance, dynamic precision, gross body coordination, and flexibility. Because the L-O yielded only a total motor score, Guilford's factor analytic results were used to refine it for the present purposes. Each item was classified as either fine or gross motor. The item breakdown of the L-O into fine and gross motor categories is shown in Table 13.

The L-O scale was then used to divide the EPS class into two instructional groups of approximately eight children each. The groups were constituted on the basis of whether the children scored high or low on the fine or gross motor portion of the L-O.

Motor Development, Study II (1965-1966). During Study II, a series of 65 motor lessons was developed by Lillie (1966). The initial lessons were designed to improve the children's motor skills, which both observation and Lincoln-Oseretsky Motor Development Scale (L-O) scores had shown to be grossly deficient. Later lessons were developed according to procedures suggested by the children's performance on the earlier lessons in the series, as reported by teachers and observers.

The typical absence of pencils, crayons, scissors, puzzles, peg boards, and other educational toys in the homes of culturally disadvantaged children provides little opportunity for them to learn fine motor skills. Significantly more home and neighborhood opportunities are assumed to be available to disadvantaged children for developing gross motor behavior. Also, a daily physical education period was designed to give the EPS subjects opportunity for gross motor development. Thus, the motor lessons emphasized fine rather than gross motor development.

Many of the lessons developed by Lillie included the kinds of

Table 13

Fine and Gross Motor Designations of the
Lincoln-Oseretsky Motor Development Scale

Item	Description	Type of Motor Task
1	Walking backwards, 6 feet	Gross
2	Crouching on tiptoe	Gross
3	Standing on one foot	Gross
4	Touching nose	Fine
5	Touching fingertips	Fine
6	Tapping rhythmically; feet and fingers	Gross
7	Jumping over a rope	Gross
8	Finger movement	Fine
9	Standing heel to toe	Gross
10	Close and open hands alternately	Fine
11	Making dots	Fine
12	Catching a ball	Fine
13	Making a ball	Fine
14	Winding thread	Fine
15	Balancing a rod crosswise	Fine
16	Describing circles in the air	Fine
17	Tapping (15")	Fine
18	Placing coins and matchsticks	Fine
19	Jump and turn about	Gross
20	Putting matchsticks in a box	Fine
21	Winding thread while walking	Fine
22	Throwing a ball	Gross
23	Sorting matchsticks	Fine
24	Drawing lines	Fine
25	Cutting a circle	Fine
26	Putting coins in a box (15")	Fine
27	Tracing mazes	Fine
28	Balancing on tiptoe	Gross
29	Tapping with feet and fingers	Gross
30	Jump, touch heels	Gross
31	Tap feet and describe circles	Gross
32	Stand on one foot	Gross
33	Jumping and clapping	Gross
34	Balancing on tiptoe	Gross
35	Opening and closing hands	Fine
36	Balancing a rod vertically	Fine

activity provided in most good preschool and kindergarten classes. They included maze tracing, coloring, cutting and pasting, placing dowels in peg boards, stencil design tracing and copying; button, snap, and hook-and-eye frames; buckles, and clay activities. In the experimental class, these activities were carefully sequenced by difficulty level so as progressively to ameliorate specific motor deficiencies shown by the children. For example, eight maze-tracing lessons constructed around materials from the Frostig Program for the Development of Visual Perception (Frostig, 1964) were used to remedy the specific eye-motor coordination inadequacy exhibited by many of the children.

Motor Lesson Development, Study III (1966-67). Evaluation of the previous year's motor lessons indicated that the strategies used in developing the lessons had been successful. Hence, few revisions were required for Study III. Interestingly, those lessons demanding the most revision were the ones based on the Frostig program, which moved too rapidly from simple to complex. Necessary intervening motor steps had been omitted, and the lessons failed to provide sufficient practice. This led to constructing a series of lessons designed to correct these difficulties which were added to the motor development program. Similar additions, deletions, and substitutions were made for the 1965-66 lessons that had been judged by the teacher to be ineffective.

RESULTS

The results are organized in two major sections which attempt to answer the questions: (1) Does the intervention program make a difference in intelligence test scores, language, personal-social behavior, and/or motor development? and (2) If the intervention makes a difference, are gains expressed and maintained in the school achievement behavior of children who have been involved in the intervention program? Section I presents the data relevant to question (1) for each of the three years of the study (Studies I, II, III, pre- and post-intervention). Results are then collapsed, combining the experimental preschool groups (EPS), the kindergarten contrast groups (KC), and the at-home contrast groups (AHC) for all three years. Section II presents the results obtained after the children had attended school for one or more years. Study I groups have experienced two years post-treatment, and Study II groups have had one year of post-treatment.

SECTION I: DATA ANALYSIS FOR PRE-POST INTERVENTION COMPARISONS

The majority of analyses were done by a One-Way Analysis of Covariance (ANOCOVA) program obtained from the Biometric Laboratory, University of Miami.

The method is adapted from Snedecor(1956) and performs analysis of covariance involving one covariate and one criterion measure with independent groups of subjects. The analysis allows for tests of the differences among regression coefficients and differences among adjusted means. These analyses provide a more precise estimate of regression and treatment effects than would be possible in alternative methods of analysis using repeated measures of independent groups. Furthermore, since the number of Ss within each treatment group is relatively small (11-16), the covariance model appears to be the most appropriate.

F-ratios with associated probabilities of less than .05 were accepted as indicating a statistically significant difference among groups on any comparison made in the study, and for any comparison of any pair of treatment means. Analyses comparing groups two at a time were made only when the overall F-ratio indicated a difference among groups at the .05 level of significance.

Pretest scores obtained prior to intervention were used as the covariate. Postintervention test data were used as the independent variable for the Stanford-Binet, Peabody Picture Vocabulary Test (PPVT), Illinois Tests of Psycholinguistic Ability (ITPA), and Columbia Maturity Scale (CMMS). Data from the Lincoln-Oseretsky Motor Development Scale (L-O) were analyzed using chronological age (CA and initial score as the covariates, since these data are in raw score form and therefore do not take into account CA differences among the groups. The Intervention Period data are discussed in the following order: (a) Intelligence, (b) Language, (c) Motor Proficiency, and (d) Personal-Social Development. Within each of these subheadings the data for each year are reported separately and then the combined data for the three EPS, three

KC, and four AHC groups are reported where relevant.

Intelligence

It was hypothesized that during the treatment period the EPS group would show greater increments in intelligence than the KC group, which in turn would show greater increments than the AHC group. To test this hypothesis each study was analyzed separately and then reanalyzed by combining the three studies. The Stanford-Binet and Columbia Mental Maturity Scale (CMMS) were used to make the pre- to posttest intelligence comparisons.

Study I (1964-65)

Stanford-Binet. The results of the Stanford-Binet Intelligence Scale, Form L-M, administered to all of the first year project children are presented in Table 14.

On initial testing in the fall of 1964, the four Study I groups' Stanford-Binet mean IQ's were not significantly different from each other. The results obtained by ANOCOVA at the time of posttesting reveal an overall F-ratio of 8.29 (p. .05). Comparisons between pairs of treatment means (t tests, suggested by Snedecor, 1956) indicated that the difference of 5.2 IQ points between the adjusted means of the EPS and KC groups, and the difference of 1.8 points between the adjusted means of the two at-home groups (AHC-L and AHC-D) were not reliable. The EPS adjusted mean was reliably greater than both the AHC-L and AHC-D adjusted means, and the KC adjusted mean was reliably greater than the AHC-L group. The KC-AHC-D adjusted means were not reliably different. These differences are summarized in Table 14.

Columbia Mental Maturity Scale. The results of a second measure of "general" intelligence, the Columbia Mental Maturity Scale (CMMS), are presented in Table 15 for the Intervention Period for the Study I (1964-65) groups.

Analysis of covariance revealed no reliable differences among the adjusted means at the time of posttesting.

Binet results partially support the hypothesis. However, no support is lent to the hypothesis by the second test of intelligence employed in the investigation, the CMMS. However, CMMS results do not include the AHC-D group, which was omitted because of insufficient testing personnel. The unaccountably much higher pretest CMMS means, as compared with the Binet means, also obscure the meaning of the results from this measure.

Study II (1965-66)

Stanford-Binet. The Binet EPS₂, KC₂, and AHC₂ analysis of covariance (pre- on posttest scores) reveal reliable differences among the means (F=21.59, p>.05). The t-tests between posttest adjusted means shown in Table 11, indicated that the Binet scores earned by the EPS group were reliably greater than those earned by the KC and the AHC groups. The KC and AHC adjusted means were not reliably different from each other (see

Table 14

Stanford-Binet Pre and Posttest Data for Study I

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₁	12	74.50	9.72	93.75	10.71	93.53	19.25
KC ₁	13	72.69	11.11	87.46	10.04	88.33	14.77
AHC-L ₁	13	74.46	12.76	80.92	9.99	80.50	6.46
AHC-D ₁	13	72.54	10.63	81.31	11.46	82.27	8.77

EPS = KC > AHC-L = AHC-D

Table 15
Columbia Mental Maturity Scale
Pre and Posttest Data for Study I

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₁	12	89.08	10.33	95.33	12.38	93.73	6.25
KC ₁	13	84.92	10.30	89.85	10.92	90.14	4.93
AHC-L ₁	12	84.25	12.76	90.75	9.19	91.70	6.50

EPS = KC = AHC

Table 16.)

Columbia Mental Maturity Scale. The CMMS data for Study II show reliable differences among the adjusted means of the three groups at the time of posttesting. The mean for EPS₂ was greater than for KC₂ and AHC₂; and the mean for KC₂ was greater than that for AHC₂ (see Table 17).

On the bases of the Study II results, the hypothesis is consistently supported by both measures of intelligence. The finding that the KC group did no better than the AHC group on the Binet may be explained by the fact that the KC group was highly saturated with children from grossly psychosocially deprived homes, as classified by the project social worker. This group contained four children (27 percent) who fell in this category group, whereas no other group contained more than two such children. The pre- to posttest Binet changes for these four children were +15, -7, +6, and -1. Thus, three of the four children made changes in intelligence which were among the lowest made by any child enrolled in the EPS or KC class.

Study III (1966-67)

Stanford-Binet. The Binet analysis of the three (Study III 1966-67) groups (EPS₃, KC₃, and AHC₃) yielded an F-ratio of 12.77 ($p > .05$), indicating reliable differences among the adjusted group means. The adjusted means (see Table 18) of the EPS group and the KC group were not reliably different from one another. However, the adjusted means of the EPS and KC groups were reliably greater than the AHC groups.

Columbia Mental Maturity Scale. The CMMS data for Study III also show reliable differences among adjusted means: the EPS₃, and KC₃ groups are equivalent, but both are reliably greater than the AHC₃ group (see Table 19).

Thus since the EPS group was equal to the KC group and the two groups were superior to the AHC group on both measures of intelligence, the hypothesis is only partially supported.

Studies I, II, and III Combined

Stanford-Binet. Combining the Stanford-Binet I.Q. data for the EPS, KC, and AHC groups respectively for Studies I, II, and III and subjecting these data to analysis of covariance yields an F-ratio of 26.57 ($p > .05$). Analysis of the differences between pairs of adjusted means reveals that the EPS groups' combined mean is significantly greater than either the KC or AHC combined mean, and that the KC mean is significantly greater than the AHC mean (see Table 20.)

Columbia Mental Maturity Scale. Combining the CMMS data for the EPS, KC, and AHC groups respectively for Studies I, II, and III, and subjecting these data to analysis of covariance yields an F-ratio of 9.11 ($p > .05$). Analysis of the difference between pairs of adjusted means reveals that the total EPS and KC groups' means are equivalent, and that both group means are reliably greater than total AHC groups' mean (see

Table 16

Stanford-Binet Pre and Posttest Data for Study II

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₂	16	76.75	8.06	91.44	9.08	90.24	14.69
KC ₂	16	75.19	9.42	79.81	9.16	79.78	4.62
AHC ₂	16	73.50	8.38	74.62	8.79	75.86	1.12

EPS > KC = AHC

Table 17

Columbia Mental Maturity Scale

Pre and Posttest Data for Study II

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₂	16	85.25	9.01	93.94	14.10	92.04	8.69
KC ₂	15	80.80	7.77	84.53	12.86	85.87	3.73
AHC _c	16	81.73	10.94	77.38	10.91	78.02	-4.35

EPS > KC > AHC

Table 18

Stanford-Binet Pre and Posttest Data for Study III

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₃	14	69.14	8.41	36.29	12.62	89.71	17.15
KC ₃	15	77.60	7.87	95.87	9.37	93.78	18.27
AHC ₃	14	76.21	8.65	77.14	11.35	75.96	.93

EPS = KC > AHC

Table 19
Columbia Mental Maturity Scale
Pre and Posttest Data for Study III

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₃	14	78.14	10.09	94.00	12.28	95.47	15.86
KC ₃	15	36.27	10.98	96.67	15.45	95.13	10.40
AHC ₃	14	81.64	9.92	82.50	9.57	82.68	.86

EPS = KC > AHC

Table 20
Stanford-Binet for Pre and Posttest Data
Studies I, II, and III Combined

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS	42	73.57 9.08		90.38 10.99 90.91			16.81
KC	44	75.27 9.43		87.54 11.51 86.90			12.27
AHC	56	74.18 9.96		78.27 8.80 78.38			4.09

EPS > KC > AHC

Table 21).

The hypothesis that the EPS group would show greater increments in intelligence than the KC or the AHC group was clearly supported when Studies I, II, and III Binet data were combined.

In that the EPS group was equivalent to the KC group, but both groups superior to the AHC group on the CMMS, the hypothesis is only partially supported by this second measure of intelligence. However, the hypothesis was supported directionally in all these studies.

Language

It was hypothesized that as a result of preschool intervention the language performance of the EPS groups would be significantly better than that of the KC groups. The KC groups in turn would be better than the AHC groups.

Study I (1964-65)

Illinois Test of Psycholinguistic Abilities (ITPA). As mentioned previously, the introduction of a formal language lesson program was delayed for four months to permit the novelty of initial school experience to wear off. A midterm ITPA was then administered to determine the pre- to midterm general language rate of gain and the language competence of the Ss prior to formal instruction.

Shortage of qualified examiners made it impossible to complete midterm ITPA tests for all of the 13 at-home control-local (AHC-L) children, or to test the at-home distal group (AHC-D). Therefore, only the EPS and KC groups were included in the evaluation of the formal language lesson program. From Table 22, it can be seen that there were no significant differences in language ages between the EPS and KC groups on the midterm ITPA test.

At the completion of the administration of the 67 diagnostic language lessons, the midterm-to-posttest ITPA scores were analyzed by a Lindquist (1963) Type I analysis of variance. The mid- to posttest gains made by both groups were significant. However, the relatively larger gains made by the EPS group did not differ statistically significantly from those made by the KC group. Therefore, it can be inferred that factors other than the formal language lessons were affecting the language changes of the groups.

To determine the effectiveness of the total language program (formal plus ancillary), pre- to posttest comparisons were made, using total ITPA language age means of all three groups. Significant gains were made by all three groups; however, analysis of variance revealed that the unadjusted mean gain of 18.9 months made by the EPS group was significantly greater than the gains of 11.09 and 9.47 months made by the KC and AHC-L groups respectively ($F=6.46$, $p>.05$). The differences between the KC and AHC-L groups were not significant.

Table 21

Columbia Mental Maturity Scale

Pre and Posttest Data for Studies I, II, and III Combined

Group	N	Pretest		Posttest			Pre to Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS	42	83.98	10.51	94.36	12.73	94.07	10.38
KC	43	83.95	9.82	90.28	14.13	90.01	6.33
AHC	42	82.43	10.96	82.90	11.19	83.47	.47

EPS = KC > AHC

Table 22

Illinois Test of Psycholinguistic Abilities

Pre, Mid, and Posttest Total Language Age Data for Study I

Group	Pretest			Midterm			Posttest				Pretest- Posttest Mean Gain
	N	Mean	SD	N	Mean	SD	N	Mean	SD	Adj. Mean	
EPS ₁	12	49.17	6.90	12	59.17	6.16	12	68.08	7.54	68.64	18.91
KC ₁	12	51.58	8.36	12	58.17	6.42	12	62.67	7.41	62.03	11.09
AHC-L ₁	13	50.15	14.51	5	57.80	8.41	13	59.62	6.23	60.46	9.47

EPS > KC > AHC

Peabody Picture Vocabulary Test (PPVT). The experimental receptive vocabulary of the project children was measured by the PPVT. As shown in Table 23, the mean pretest PPVT quotients of the groups were comparable, with the exception of the at-home distal contrast group (AHC-D). A significant F-ratio of 4.06 ($p > .05$) was obtained from analysis of covariance. Subsequent t-tests among the adjusted means indicated that the PPVT mean posttest score made by the EPS group was significantly greater than those made by the KC, AHC-L, and AHC-D groups. There were no significant differences among the three contrast groups.

The results obtained from both the ITPA and PPVT support the hypothesis that the preschool language treatment would increase the language performance of the EPS groups significantly more than that of the KC groups, and the KC groups more than the AHC groups.

Study II (1965-66)

As indicated in Procedure, the ITPA was not used as a pre-post instrument for Study II. Procedural errors during language data collection coupled with the gathering of insufficient numbers of language samples necessary for making a linguistic analysis made it necessary to use such global indices as Binet vocabulary and PPVT for evaluating the 1965-66 language program.

Binet Vocabulary. Analysis of the Binet vocabulary posttest protocols at the 6 year old level indicated that 47 percent of the EPS group had passed at that level as compared to only 10 percent of the KC groups and 14 percent of the AHC group.

The EPS group passed 5.5 words on the average at posttest, whereas the KC and AHC groups passed 3.6 and 3.5 words respectively where the necessary number of words required to pass Vocabulary is six. Compared to pretest passes these means represent gains of 3.6, 1.0, and 1.2 words for EPS, KC, and AHC respectively. It should be stated, parenthetically, that these words were not specific aspects of the diagnostic curriculum. Analysis of the Binet 6-year old Vocabulary was analyzed in this way since it is such a powerful indicator of school success (correlations of approximately .75).

Peabody Picture Vocabulary Test (PPVT). Analysis of covariance with pretest on posttest scores yielded a significant F-ratio of 9.43 ($p > .05$). Further comparisons of the adjusted means by t-tests indicated that the EPS group had performed significantly better than the KC and AHC groups. There were no significant differences between the KC and AHC groups (see Table 24).

The hypothesis that the EPS group's language performance would be significantly improved during the treatment period was supported. The poor language performance of the KC group parallels their poor intellectual performance. A possible explanation for this finding has already been offered.

Table 23
Peabody Picture Vocabulary Test
Pre and Posttest Data for Study I

Group	N	Pretest		Posttest			Pretest- Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₁	12	63.67	24.26	94.83	6.41	95.44	31.16
KC ₁	13	64.54	23.57	79.46	15.86	81.20	14.92
AHC-L ₁	13	65.00	14.71	79.15	20.30	79.67	14.15
AHC-D ₁	13	73.15	19.68	80.54	15.63	78.50	7.39

EPS > KC = AHC-L = AHC-D

Table 24

Peabody Picture Vocabulary Test

Pre and Posttest Data for Study II

Group	N	Pretest		Posttest			Pretest- Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₂	16	66.25	23.64	94.62	9.53	94.17	28.37
KC ₂	16	68.00	16.65	77.94	16.89	76.68	9.94
AHC ₂	16	61.50	26.01	71.81	23.50	73.52	10.31

EPS > KC = AHC

Study III (1966-67)

Illinois Test of Psycholinguistic Abilities (ITPA). In the event that another attempt at performing a linguistic analysis of the language samples of the project children such as had been attempted for Study II should fail, the ITPA was again introduced as a pre- and post-measure of language change.

Analysis of covariance produced a significant F-ratio of 15.81 ($p < .05$). The t-tests among adjusted means indicated no significant differences between the EPS and KC groups. Both group means, however, were significantly greater than the AHC group mean (see Table 25).

Peabody Picture Vocabulary Test (PPVT). A significant F-ratio of 6.63 ($p < .05$) was obtained in this analysis of covariance. Comparisons among adjusted means by t-tests produced no significant differences between the EPS and KC groups. Both groups performed significantly better than the AHC group (see Table 26).

Linguistic Analyses. Language samples obtained from the San Francisco Inventory of Communication Effectiveness (SFICE) were compared with respect to number of responses, mean response length, total words used, unanalyzable elements, mazes, negative responses, extraneous responses, and parts of speech used. Table 27 shows the pre- and posttest means for those dimensions analyzed to date.

It is readily apparent that prior to treatment the language of the EPS group was significantly poorer than that of the two contrast groups. In the absence of the posttest results from the AHC group at this time, no statistical analyses of these data could be made. A visual comparison of the EPS group with the KC group appears to indicate that substantial language gains were made by both groups; however, it is quite apparent that the language of the KC group is still superior to that of the EPS group following treatment.

Since the gains of the EPS group were equal to those of the KC groups, but both were greater than those of the AHC group, the hypothesis was only partially supported for Study III.

Studies I and III Combined

Illinois Test of Psycholinguistic Abilities (ITPA) Total Language. Combining the data for the EPS, KC, and AHC groups respectively for Studies I and III (the years in which the ITPA was used on a pre-posttest measure) and analyzing the data using analysis of covariance yielded an F-ratio of ($p < .05$). Comparisons of pairs of adjusted posttest means revealed that the EPS mean was greater than the KC mean and that both group means were greater than the AHC group mean (see Table 28).

Illinois Test of Psycholinguistic Abilities (ITPA) Language Subtests. As shown in Table 29, the analysis of the combined subtest data from the ITPA revealed reliable differences among means for five of the nine

Table 25
 Illinois Test of Psycholinguistic Abilities
 Total Language Age Data for Study III

Group	N			Posttest			Pretest- Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₃	14	44.21	8.28	61.86	6.15	64.95	17.65
KC ₃	15	50.87	6.27	64.27	7.51	62.27	13.40
AHC ₃	14	49.50	7.36	54.36	9.56	53.40	4.86

EPS = KC > AHC

Table 26
Peabody Picture Vocabulary Test
Pre and Posttest Data for Study III

Group	N	Pretest		Posttest			Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₂	14	63.93	18.46	84.57	17.94	85.35	20.64
KC ₂	15	70.20	21.93	90.47	9.67	88.17	20.27
AHC ₂	14	62.07	22.73	70.79	18.77	72.47	8.72

EPS = KC > AHC

Table 27
Linguistic Data for Study III^a

Groups	Number of Responses		Mean Length of Response		Total Words		Unan. Utterances		Mazes		Extran. Responses		Negative Responses	
	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean	Pre Mean	Post Mean
EPS ₃	63.41	60.58	5.00	7.91	334.00	448.75	20.83	16.33	9.41	25.50	11.41	6.25	2.75	3.83
KC ₃	44.61	32.46	9.73	15.91	364.92	340.0	13.15	9.46	21.46	26.07	2.92	1.00	1.23	.77
AHC ₃	56.53	54.07	7.75	7.08	381.23	302.15	17.00	21.46	21.46	18.46	8.77	1.69	1.46	4.61

^aDefinitions of categories are given in Appendix C.

Table 28

Illinois Test of Psycholinguistic Abilities
Total Language Age Data for Studies I and III Combined

Groups	N	Pretest	Posttest		Pre to Posttest Mean Gain
		Mean	Mean	Adj. Mean	
EPS	26	46.60	64.73	66.46	18.13
KC	27	51.27	63.74	62.46	12.47
AHC	27	50.52	57.33	56.95	6.81

EPS > KC > AHC

subtests Motor Encoding, Auditory-Vocal Association, Visual-Motor Association, Visual-Motor Sequencing, and Vocal Encoding. The EPS group is significantly better than the KC and AHC groups on Motor Encoding, Auditory-Vocal Association, and Vocal Encoding. The EPS and KC groups are equal to each other and both are better than the AHC group on Visual-Motor Sequencing and Visual-Motor Association. The KC group means were higher than the AHC group on Visual-Motor Sequencing, Vocal Encoding, and Visual-Motor Association.

From the results of these analyses, it appears clear that being in a kindergarten program results in the acceleration of language development as measured by the ITPA. In addition, being exposed to a cognitively based diagnostic curriculum which includes language lessons and ancillary language activities produces gains in areas which the curriculum emphasizes.

Inspection of the subtest differences shows that on those subtests of expressive behavior (Vocal and Motor Encoding) the EPS children are clearly superior. As will be recalled, a major effort was made in the language lessons, the Story of the Week, the Muscle Club, the Sharing Period, as well as at other times, to elicit appropriate verbal and motoric responses from the children. This phase of the Intervention Period was an obvious success. The success of these activities measured by these particular subtests may, however, be the result of increases in socialization and/or a much more favorable concept of self, particularly in relations with adults. The reason this point is brought up is that, in the authors' observations of the administration of the ITPA, the subtests of Vocal and Motor Encoding are the most susceptible to examiner influence and are therefore more likely to show depressed scores for the shy, withdrawn child than for the more outgoing child. In other words, there may be as high a loading of emotional factors in these two subtests as there is of a language ability factor.

The EPS children are also superior on the subtest consisting of verbal analogies (Auditory-Vocal Association). This may again reflect the diagnostic curriculum, which placed great emphasis on the relationship among words. Further evidence for this possibility is that the KC group was not superior in this skill to the AHC group.

The EPS and KC children were not different from each other on the two visual subtests consisting in one instance of putting from memory small chips in a tray in appropriate order (Visual-Motor Sequencing) and in the other instance of a pictorial analogies task (Visual-Motor Association). Both groups performed better on these two tasks than the AHC children. This suggests that a basically good kindergarten, irrespective of diagnostic teaching will enhance these kinds of abilities.

It is also interesting to note that the grammar subtest, the subtest matching similar pictures, the digit span subtest, and the auditory decoding subtest reflected no differences among the three groups. Since these tests consist primarily of lower order cognitive skills than the subtests which reflect differences, it is possible that these skills were de-emphasized in the experimental curriculum in order to improve the

Table 29

Illinois Test of Psycholinguistic Abilities
Subtest Data for
Studies I and III Combined

Subtest	Adjusted Posttest Means		
	EPS (N=25)	KC (N=26)	AHC (N=23)
Auditory-Vocal Automatic	56.87	56.74	55.53
Visual Decoding Test	75.65	69.88	68.35
Motor Encoding Test ^a	72.91	63.74	60.34
Auditory-Vocal Association ^b	66.29	61.61	59.15
Visual-Motor Sequencing ^c	69.96	66.00	56.15
Vocal Encoding Test ^d	70.92	63.25	50.98
Auditory-Vocal Sequencing	57.77	58.88	54.82
Visual-Motor Association ^e	72.30	73.39	61.13
Auditory Decoding	61.85	64.95	56.56

^aEPS > KC = AHC

^bEPS > KC = AHC

^cEPS = KC > AHC

^dEPS > KC > AHC

^eEPS = KC > AHC

higher level cognitive skills.

Studies I, II, and III Combined

Peabody Picture Vocabulary Test (PPVT). Results from collapsed pre- and posttest PPVT results supported Hypothesis I, as can be seen in Table 30. The F-ratio from analysis of covariance was significant, and between-groups t-tests show that total EPS on posttest stands significantly higher than total KC. Total KC is significantly higher than Total AHC. Raw gain scores from pre- to posttest are: EPS = 26.60; KC = 14.63; and AHC = 10.12.

Peabody Picture Vocabulary Test (PPVT) Item Analysis. A correlation was computed between the difficulty level of the PPVT items for the original standardization population and the present population of psychosocially disadvantaged children. This correlation was a .71, and the greatest discrepancy between the present population and the standardization population was for gerunds.

Fifty-two separate words (PPVT items) allowed comparison among the EPS, KC, and AHC total samples. The Hypothesis I prediction for posttest percent passing of EPS > KC > AHC (with pretest constant or EPS lowest) was supported for 23 of the items. This order would have been predicted by chance for only 9 items, using the most conservative estimate of probability (i.e., not taking into account items on which EPS ranked highest at pretest). Other than gerunds, these words were: bee, bush, kangaroo, accident, nest, caboose, badge, peacock, coach, whip, dial, tumble, signal, group, counter, ceremony, and delight.

Of the 10 gerunds included among these items, the prediction of EPS > KC > AHC was supported for 5. Expectancy of this order of ranking is for 1 item only. A reversal of the order occurred for only one gerund; EPS was high with the other two groups tied for two gerunds; and EPS was tied with one of the other two groups for two gerunds. The five gerunds for which EPS > KC > AHC were: tying, pouring, sewing, picking, and yawning. The only reversal of order occurred for tackling. EPS was highest, the other groups tied for directing; and EPS was tied with another group for digging and catching.

In summary, review of all the data gathered during Studies I, II, and III leads the authors cautiously to conclude that children who had experienced a diagnostically based curriculum were better prepared to enter first grade than those who attended a traditional kindergarten. The kindergarten children were in turn generally better prepared than children with no school experience. In other words, Hypothesis I has been moderately well supported.

On the basis of these combined data, the hypothesis that the language treatment would improve the language performance of the EPS group significantly more than that of the KC and AHC groups was clearly supported

Motor Development

Table 30

Peabody Picture Vocabulary Test Pre and Posttest Data
for Studies I, II, and III Combined

Group	N	Pretest		Posttest			Pretest- Posttest Mean Gain
		Mean	SD	Mean	SD	Adj. Mean	
EPS	42	64.73		91.33		91.90	26.60
KC	44	68.34		82.97		81.95	14.63
AHC	56	65.16	21.44	75.28	19.89	75.66	10.12

EPS > KC > AHC

It was hypothesized that as a result of the preschool intervention the EPS group would perform significantly better than the KC group, which in turn would perform better than the AHC group in motor development. The Lincoln-Oseretsky Motor Development Scale (L-O) was used as the pre-posttest criterion measure during Studies II and III. The hypothesis was also tested at the end of each Study and then with the two Study groups combined.

Study II (1965-66). The effectiveness of the motor development lessons was estimated by co-varying CA and the respective pretest raw scores of fine, gross, and total Lincoln-Oseretsky Motor Development Scale (L-O) on posttest fine, gross, and total raw scores. As stated previously, the fine and gross motor scoring procedure was developed specifically for this project by Lillie (1966).

Significant F-ratios of 11.57 and 3.78 were obtained for the Fine and Total L-O analyses respectively. Comparisons between adjusted posttest means of the Fine Motor scores showed $EPS > KC > AHC$. The comparison between Total Motor adjusted posttest means revealed that the EPS group was equal to the KC group, and that both groups were significantly higher than the AHC group. Substantial gains in Gross Motor scores were made by all three groups, but the analysis of covariance showed no significant differences among the groups (see Table 31).

It is apparent that for Study II the hypothesis was supported for Fine Motor development only. Thus, although the traditional kindergarten curriculum experiences are effective in improving the fine motor abilities of severely disadvantaged children, even more effective results can be obtained by using lessons similar to those developed by Lillie.

While not supporting the hypothesis, the Gross Motor results suggest that the home experiences of these children provide as much opportunity for developing gross motor skills as school experiences. This is especially noteworthy because the EPS and KC groups were exposed to a daily half hour physical education period in which these skills were stressed. It seems reasonable to conclude that these experiences fail to improve gross motor skills any more than general gross motor experiences available in the home or neighborhood.

Study III (1966-67). Again, the F-ratios of 5.74 and 4.31 for the Fine and Total Motor scores were significant. However, while Study II EPS improvement was significantly greater than KC, for Study III EPS and KC groups were equal. Both improved significantly more than AHC. The results for Total Motor are similar: $EPS = KC$, both groups doing better than AHC. There were no significant differences among the three groups in Gross Motor development, as was also true for Study II (see Table 32). Thus, the hypothesis was partially supported for Fine and Total Motor development and not supported for Gross Motor development. The decrease in Fine Motor performance and the increase in Gross Motor performance of the AHC group from pre- to posttesting provides additional evidence for the fact that the home experiences of severely disadvantaged children are inadequate for fine motor development and relatively adequate for gross motor development.

Table 31
Lincoln-Oseretsky Motor Development Scale
Raw Score Data for Study II

Group	N	Fine				Gross				Total			
		Pretest	Posttest		Gain	Pretest	Posttest		Gain	Pretest	Posttest		Gain
		Mean	SD	Adj. Mean		Mean	SD	Adj. Mean		Mean	SD	Adj. Mean	
EPS ₂	16	11.56	7.39	23.44	11.88	7.25	3.44	11.88	4.63	18.81	9.38	35.31	16.50
				10.11	24.55			6.25				14.76	35.65
KC ₂	16	16.94	9.21	21.31	4.37	8.94	6.17	11.38	2.44	25.88	12.31	32.81	6.93
				8.38	20.50			4.76				10.91	31.58
AHC ₂	14	15.29	6.50	16.50	1.21	6.21	3.24	10.50	4.29	21.50	8.83	27.00	5.50
				5.40	16.16			5.11				7.51	28.03

EPS > KC > AHC EPS = KC = AHC EPS = KC > AHC

Table 32

EPS = KC > AHC

Studies II and III Combined

For combined Studies II and III, Fine Motor EPS and KC adjusted means do not differ significantly from each other, but both are significantly higher than the AHC mean.

Adjusted means for Gross Motor do not differ among the three groups.

Results for Total Motor, reflecting the influence of the Fine Motor gains, are identical in direction to Fine Motor, with EPS = KC, and both EPS and KC significantly higher than EPS.

The hypothesis posits the greater effectiveness of the diagnostically based curriculum compared to regular kindergarten experience, and the superiority of the latter over regular at-home living. The hypothesis is clearly supported for the Study II children. The only conclusion that can be drawn either from the Study III results taken alone, or the combined results when Studies II and III are collapsed, is that a school experience, whether EPS or KC, is clearly superior for fine motor development to living in such homes as characterized the subjects of the study. In these homes, opportunities to develop the type of fine motor skills essential for such school skills as writing, drawing, cutting, and so on are conspicuously absent.

Table 33 summarizes the pre- posttest results for L-O Fine, Gross, and Total Motor scores for Study II and Study III groups combined.

Personal-Social Development

Study III (1966-67). Although research in affective areas is not as definitive as for intellectual variables, both formal and informal evidence clearly indicate that non-intellectual variables play a crucial role in school adjustment. Involvement in the "task-at-hand" is clearly an important non-intellectual variable related to such personal-social adjustment.

In the absence of adequate personal social measures at the preschool level (Kohlberg, 1966), an observational instrument was developed by Hodges and McCandless early in the second year of the Indiana Project. It was used as a pretest-posttest evaluation instrument in Study II and Study III. A copy of the scale is included as appendix C of this report.

Observations of Task Involvement (TI) were conducted by persons other than the authors during the last two weeks in September and again during the first two weeks in May. Two raters made independent judgments of TI. Each observation consisted of a 5 second period for each child. Approximately 60 ratings were obtained for each child at pretesting and again at posttesting. Four observations per child for each of three activities on five consecutive days were obtained. Observations were made while the children were engaged in the following three activities:

1. A lesson from the Peabody Language Development Kit.

Lincoln-Oseretsky Motor Development Scale

Raw Score Data for Studies II and III Combined

Group	N	Fine						Gross						Total								
		Pretest			Posttest			Gain	Pretest			Posttest			Gain	Pretest			Posttest			Gain
		Mean	SD	Adj. Mean	Mean	SD	Adj. Mean		Mean	SD	Adj. Mean	Mean	SD	Adj. Mean		Mean	SD	Adj. Mean	Mean	SD	Adj. Mean	
EPS	30	11.00	6.81	19.60	9.68	21.22	8.60	7.10	4.00	14.27	6.81	14.41	7.17	18.10	9.42	33.87	13.16	35.79	15.77			
KC	31	13.39		19.61	7.61	19.57	6.22	8.58	4.61	14.42	6.48	14.06	5.84	21.97	10.45	34.10	6.39	33.41	12.13			
AHC	28	15.64	7.26	14.86	5.50	13.17	-0.78	7.25	4.55	12.46	6.39	12.70	5.21	22.90	10.71	27.32	9.50	26.03	4.42			

EPS = KC7AHC

$$\text{EPS} = \text{KC} = \text{AHC}$$

EPS = KC > AHC

2. A table activity such as coloring, cutting or making clay objects.
3. While listening to a story.

During the observation weeks, the same activities were used in both EPS and KC classes. The activities were also similar from pre- to post-testing, although the complexity of the tasks were greater to posttesting than at pretesting.

The inter-rater consistency for the TI scale on each of the tasks observed and all tasks combined ranged from .78 to .98. Only one index (of .78) fell below .90. Odd-even reliability coefficients obtained from these same data ranged from .38 to .62 with a median of .50. This indicates considerable variability of degree of task involvement within individual children. Independently, McCandless, (unpublished, 1967) has obtained odd-even correlation of .78, .80, and .82 from observations of three groups of four-year old Negro and white children in Atlanta, Georgia, using the same instrument. Pairs of observers in the McCandless study also obtained high consistency of observation quotients (.95-.98).

Analyses of the data of the task involvement study (Lindquist, Type I, ANOVA) conducted during Study III (after the instrument had been put into final form) indicated that the EPS₃ group was significantly below the KC₃ group on the TI scale (as it was on other measures) at pretest but made a significant gain from pre- to posttest while the KC group made so gain. At the time of posttesting there was no significant difference between the two groups (see Table 34).

Section II: Data Analysis of Follow-up Results

Hypothesis II postulates that the three treatment groups will show differential adjustment to regular school. It was predicted that children who participated in the experimental preschool groups (EPS), would succeed better in school than the groups of children who attended a traditional kindergarten (KC). In turn, the KC children would excel the at-home contrast children (AHC).

Results pertinent to this hypothesis are discussed in the following order: Intelligence, Language, Motor, Academic, and Personal-Social.

Intelligence

Stanford-Binet Results. The predicted order for Binet status at the end of the first grade year for Study I and Study II groups and at the end of the second grade for the Study I group is as follows: EPS > KC > AHC.

Table 35 gives Binet data for Study I, Study II, and the two studies combined.

First Grade Follow-up for Study I. The F-ratio of 5.80 for analysis of covariance for the Study I groups was significant. The four groups, homogeneous at the time of pre-intervention Binet testing, differed

Table 34

Task Involvement-Scale

Pre and Posttest Data for Study III

Group	N	Pretest		Posttest	
		Mean	SD	Mean	SD
EPS ₃	13	4.23	.51	4.68	.61
KC ₃	12	4.96	.37	4.98	.28

Table 35
Stanford-Binet Follow-up 1 Data
for Studies I, II, and Studies I and II Combined

Group	N	Pretest		Follow-up 1			Pretest Follow-up 1 Mean Gains
		Mean	SD	Mean	SD	Adj. Mean	
EPS ₁	11	74.54	9.72	97.36	12.84	97.09	22.82
KC ₁	11	75.00	11.11	83.18	8.77	82.63	8.18
AHC-L ₁	13	74.46	12.76	91.69	10.52	91.47	17.23
AHC-D ₁	13	72.54	10.63	84.77	11.37	86.69	12.23
EPS ₂	15	76.33	8.06	87.80	9.91	87.06	11.47
KC ₂	16	75.19	9.42	85.31	9.28	85.54	10.12
AHC ₂	13	74.77	8.38	86.23	10.09	86.81	11.47
Total EPS	26	75.79		91.29		90.40	15.50
Total KC	27	74.07		82.93		83.28	8.87
Total AHC	39	74.05		86.88		87.24	12.83

significantly from each other at the end of Ss' first school year. Between-groups t-tests reveal that the adjusted mean for F^1 for EPS is significantly greater than for KC and for AHC-D. While in the predicted direction, the approximately 5.6 point advantage of EPS over AHC-L does not reach statistical significance.

KC falls significantly below AHC-L at the time of F^1 , and does not differ from AHC-D.

For three of the four groups (EPS, AHC-L, and AHC-D), inspection suggests that group shifts are of practical as well as statistical significance. Unadjusted means for all three groups shifted from the borderline retardation to the low normal intellectual classification. The EPS unadjusted mean IQ of 98.34 closely approximates the national Binet sample average for six year old children.

First Grade Follow-up (F^1) for Study II. For Study II (1965-66), inspection reveals that the groups, homogeneous at the time of the pre-intervention Binet given at about five and one-half years of age, are also homogeneous on the F^1 Binet, given more than one and one-half years later. As was true for Study I, all groups have moved beyond the upper limit of the classification of borderline retardation, but no differential change among groups is shown.

First Grade Follow-up (F^1) for Studies I and II Combined. The F-ratio for the analysis covariance for Studies I and II collapsed is 4.64. This is significant ($p < .05$). The t-tests among the adjusted mean shown in Table 34 reveal that at F^1 the collapsed EPS groups are significantly higher than the collapsed KC groups, but that their approximately three point advantage over the collapsed AHC groups does not approach significance. In turn, the four point advantage of the AHC over the KC groups is not significant.

The F-ratio for the adjusted means in Table 36 is 2.07. This fails to reach statistical significance. The order of unadjusted F^2 means is the same as that of the F^1 means, although shrinkage has occurred at both ends (i.e., EPS and AHC-L show slight losses in mean I.Q., KC and AHC-D slight gains). At F^2 , all groups fall above the upper limit of the borderline retardation range, and EPS still retains nearly a six point advantage over the next highest group in unadjusted mean score.

While according to mean Binet I.Q., the combined EPS and AHC groups have, on the average, shifted from the borderline retardation to the normal classification, the KC children have not. However, even they show an unadjusted mean gain over the nearly two years between pre- and F^1 -testing of nearly nine points.

During their first year in school, EPS₁ children gained slightly in Binet quotient (3.61 points), EPS₂ children lost an equal amount (-3.64 points). KC₁ children lost (-4.28 points), while KC₂ children gained (5.50). For two of the three contrast groups in Studies I and II, mean Binet gains were large (10.77 and 11.61 points respectively). The at-home

distal (diffusion control -- AHC-D) contrast group showed only a modest Binet gain during the first year of school (3.46 points).

In short, the intervention children, whether EPS or KC, seem to have stabilized in I.Q. by the time their preschool year was finished (in other words, these gains were not lost); but the at-home children, given the new experiences of first grade (for most of them--a few were kept out of school because teachers believed they were not yet ready) spurt in I.Q. to when they do not differ statistically from the children who have had school experience.

Second Grade Follow-up (F^2) for Study I. Follow-up results at the end of the two school years after the intervention program (F^2) are available only for the four Study I groups. These results are summarized in Table 36.

Columbia Mental Maturity Scale (CMMS) Results

As for the Binet, Hypothesis II predicts F^1 and F^2 status for the CMMS to be: $EPS > KC > AHC$.

In Table 37 are shown the F^1 results for the Study II groups (the CMMS, due to lack of available testing personnel, was not given for follow-up 1 for Study I). F^2 results for Study I children are given in Table 38.

First Grade Follow-up (F^1) for Study II. The F-ratio for the adjusted means shown in Table 37 is 0.65, which is non-significant. Gain scores are minimal for all three groups, with AHC remaining constant and KC gaining very slightly more than EPS. While all three subgroups of Study II fell above the borderline retardation range on the Binet, only EPS does do for the CMMS.

Comparison of Table 37 with Table 35, which shows comparable pretest to F^1 data for Study II groups on the Binet, indicates that the children in all three groups had pretest scores substantially higher on the CMMS than on the Binet. F^1 means for the Binet and CMMS were however almost identical for EPS and KC, and for AHC the CMMS mean was lower than the Binet.

From pretest to F^1 , EPS Binet gains were 11.5 points, CMMS gains about 2.5 points; KC Binet gains 10 points, CMMS gains less than 4 points; and AHC Binet gains 10.5 points, while on the CMMS they showed identical means for pretest and F^1 .

For whatever reason, the CMMS appears to be less sensitive than the Binet to whatever it is that happens to children during an intervention experience and a succeeding school year.

Second Grade Follow-up (F^2) for Study I. The F-ratio for the adjusted means in Table 38 is not significant. The order of the adjusted means is opposite to prediction, with AHC-L ranking first, KC intermediate, and EPS lowest. AHC-D was not tested because of lack of testing personnel.

Table 36
Stanford-Binet Follow-up 2
Data for Study I

Group	N	Pretest		Follow-up 2			Pretest
		Mean	SD	Mean	SD	Adj. Mean	Follow-up 2 Mean Gains
EPS ₁	11	74.54	9.72	94.91	10.95	94.67	20.36
KC ₁	11	75.00	11.11	85.54	11.40	85.07	10.54
AHC-L ₁	13	74.46	12.76	89.23	8.60	89.04	14.78
AHC-D ₁	13	72.54	10.63	86.54	12.51	87.33	14.00

Table 37
Columbia Mental Maturity Scale
Follow-up 1 Data for Study II

Group	N	Pretest		Follow-up 1		
		Mean	S.D.	Mean	S.D.	Adj. Mean
EPS ₂	15	85.47	9.01	88.20	13.64	86.43
KC ₂	15	80.80	7.77	84.47	10.53	85.87
AHC ₂	13	82.23	10.94	82.23	12.29	82.66

Table 38
Columbia Mental Maturity Scale
Follow-up 2 Data for Study I

Group	N	Pretest		Follow-up 2		
		Mean	S.D.	Mean	S.D.	Adj. Mean
EPS ₁	11	90.54	10.33	86.64	7.65	85.59
KC ₁	13	84.92	10.30	86.62	17.35	87.00
AHC-L ₁	12	84.25	12.76	88.92	15.76	89.47

The pattern of pretest and F^2 means and gain scores for the Binet and CMMS for the Study I groups as revealed in Tables 36 (Binet) and 38 (CMMS) is almost identical to the pretest- F^1 pattern of the Study II groups discussed immediately above. For this group as well, all CMMS pretest means were substantially higher than pretest Binet means, and the change from pretest to F^2 is much less for the CMMS. While on the Binet, EPS ranks highest at F^2 , AHC-L ranks highest at F^2 on the CMMS, although the F^2 means on the CMMS are essentially identical for the three groups. For the Study I children, then, as well as for the Study II children, the CMMS appears to be insensitive, at least in follow-up, to the preschool and school experiences of children such as represented by this population.

Language

The second major area of assessment of change as a result of treatment was in the area of language. The Peabody Picture Vocabulary Test (PPVT) was at all times given parallel to administration of the Binet. The Illinois Test of Psycholinguistic Abilities (ITPA) was used as a consistent language follow-up measure for the Study I groups. Although the ITPA was used as a follow-up measure of the Study II groups, the unavailability of pre- and post ITPA data for these groups makes it impossible to make a longitudinal comparison for Study II.

Peabody Picture Vocabulary Test (PPVT). Hypothesis II predicted that PPVT status at F^1 and F^2 would be as follows: $EPS > KC > AHC$. Table 39 includes a summary of pretest to F^1 data for Studies I and II, and for the populations of the two Studies combined.

The Peabody Picture Vocabulary Test (PPVT) was used as a measure of receptive language. PPVT results are presented in the same order as was employed immediately above for the Binet follow-up results. Table 39 includes a summary of pretests to F^1 PPVT data for Studies I and II, and for the two studies collapsed.

First Grade Follow-up (F^1) for Study I. Due to loss of Ss in F^1 , the pretest means for Study I vary more from each other than was true for pretest Binet scores, the AHC-D group being particularly deviant. Sizable gains in PPVT score over pretest means persist for all four groups at the end of the first grade year. They are (rounded) 32, 29, 20, and 13 points for the EPS, KC, AHC-L, and AHC-D groups respectively. Three of the four groups (unadjusted means) are now higher than the upper limit of the borderline retardation range. As may be noted from Table 38 for F^1 Binet scores, the mean PPVT scores much more closely approach the Binet scores at F^1 testing than they did at pretesting. Actually, they are higher than the Binet means for KC and AHC-D (AHC-D showed a slight PPVT superiority at pretest, but at pretest the other groups' PPVT means ranged from about 10 to 13 points lower than the Binet means).

While the adjusted F^1 mean for EPS is higher than for any of the other groups, the F-ratio by analysis of covariance was not statistically significant. The order of the F^1 PPVT means is the same as for the F^1 Binet means and, from high to low it is: EPS, AHC-L, AHC-D, and KC.

Table 39

Peabody Picture Vocabulary Test Follow-up 1 Data
for Studies I, II, and Studies I and II Combined

Group	N	Pretest		Follow-up 1		
		Mean	S.D.	Mean	S.D.	Adj. Mean
EPS ₁	11	61.36	24.26	92.82	10.24	93.30
KC ₁	11	64.27	23.57	84.46	7.41	84.65
AHC-L ₁	13	65.00	14.71	89.38	10.96	89.51
AHC-D ₁	13	73.15	19.68	86.00	12.14	85.30
EPS ₂	15	64.20	23.64	87.33	6.94	88.27
KC ₂	16	68.00	16.65	82.44	15.50	81.91
AHC ₂	13	67.77	26.01	84.92	16.36	84.49
Total EPS	28	65.14		89.50		89.67
Total KC	29	66.45		82.07		81.92
Total AHC	41	65.88		84.46		84.45

First Grade Follow-up (F^1) for Study II. The F-ratio for the adjusted F^1 PPVT means for the Study II groups is not significant. The order of the adjusted F^1 means is similar to that for the Study I groups. EPS is about four points higher than AHC, which in turn is about 3 points higher than KC. Pretest means are more homogeneous than they were for Study I and, as in Study I, PPVT means have shifted from substantially below pretest Binet means to approximate equality at the time of the F^1 tests. However, unlike the results of Study I, only one subgroup (EPS) has moved above the borderline retardation range, and it by only slightly more than two score points (raw mean).

First Grade Follow-up (F^1) for Study I and II Combined. Two of the three groups in the study have now completed their first regular elementary school year, and have been retested. After collapsing Studies I and II, PPVT pretest means are almost identical, but at F^1 the EPS mean is 4.5 points above the upper limit of the borderline mental retardation classification. KC and AHC remain within the classification but near its upper limit rather than in the lower one-half of the range. PPVT means are nearly identical with Binet means at F^1 , although they had been an average of about 10 points below them at pretest. The F-ratio for the adjusted F^1 means is 2.49. This approaches but does not reach .05 level statistical significance ($p = .088$). The order of the unadjusted means for the collapsed groups is the same as for the groups considered separately, EPS being highest (5 points higher than AHC), KC lowest (about 2.5 points lower than AHC). Raw score pretest to F^1 gains have been 24 points for EPS, 18.6 points for AHC, and 15.6 points for KC. The large variances typical for the PPVT can be noted in Table 39, as in all the PPVT tables.

Second Grade Follow-up (F^2) for Study I. Only the four Study I groups have experienced two years of regular school following the intervention treatment. Results for this 1964-65 group are shown in Table 40. F^1 to F^2 , the over-all means were the same. PPVT still remains close to Binet in unadjusted mean score for three of the four groups, although it is now more than six points lower for EPS (in contrast to 4.5 points lower at the time of F^1).

For Table 40 as a whole, there is no significant difference in the adjusted F^2 means. The order has changed slightly from F^1 , although EPS still retains the highest mean, being about 2.5 points higher than the AHC-L group. KC is now almost five points higher than AHC-D, although it was slightly lower at F^1 .

Illinois Test of Psycholinguistic Abilities (ITPA). ITPA follow-up results are available only for three of the four Study I groups. Prediction from Hypothesis II concerning group status is the same as for the PPVT: $EPS > KC > AHC$. Results are summarized in Table 41.

The F-ratio fails to approach significance for either F^1 or F^2 . Pretest means are homogeneous. At the beginning of the intervention treatment, the children averaged about 66 months in chronological age. Thus the average child in Study I was retarded almost one and one-half years in language usage as measured by the ITPA. Language age according to this

Table 40
Peabody Picture Vocabulary Test
Follow-up 2 Data for Study I

Group	N	Pretest		Follow-up 2		
		Mean	S.D.	Mean	S.D.	Adj. Mean
EPS ₁	11	61.36	24.26	88.73	8.42	89.53
KC ₁	11	64.27	15.86	86.18	13.80	86.50
AH ¹						
AHC-L ₁	13	65.00	14.71	86.85	8.64	87.05
AHC-D ₁	13	73.15	19.68	83.00	11.67	81.85

Unadjusted mean F² PPVT scores have dropped from the F¹ level for all groups but KC. Although there were minor changes in unadjusted Binet means.

Table 41
Illinois Test of Linguistic Abilities Follow-up 1 and 2
Total Language Age Data for Study I

Group	N	Pretest		Follow-up 1		Follow-up 2		Adjusted Mean Adjusted Mean	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Follow-up 1	Follow-up 2
EPS ₁	11 ^a	50.091 ^a	6.90	73.727	6.03	83.300	7.21	74.087	83.147
KC ₁	11	51.727	8.36	71.909	10.78	78.818	15.32	71.174	78.059
AHC-L ₁	13	50.154	14.51	70.154	6.84	78.231	10.59	70.471	78.992

^aOne child was lost from follow-up 2. N for pre-and post for F² for EPS is thus 10. The unadjusted pretest mean then becomes 51.100, + .109 greater than for the original mean for N = 11.

instrument, however, is advanced over performance on the PPVT, a test of receptive language. The ITPA includes several subtests that tap expressive language. This finding, again, is not uncharacteristic of such populations.

It is obvious, from looking at the unadjusted means for F^1 , that the rate of language growth has accelerated sharply for all three subgroups: the mean gain over the approximately 20 months between pretest and F^1 has been about 20 months (a ratio of 1:1, compared to the extrapolated previous ratio of growth of 100:75).

In the 12 months between F^1 and F^2 , rate of growth decelerates, being (for unadjusted means) less than 10 months for EPS, less than 7 months for KC, and slightly more than 8 months for AHC-L. At F^2 , the average child is about 99 months in C.A. Thus, absolute retardation in language usage is, if anything, greater than before the intervention treatment. However, relatively, the children have gained more in language than in general ability.

As with other tests of ability and language (except for CMMS for F^2 for Group 1), the EPS group stands highest at F^2 . The difference in unadjusted means shows the EPS mean approximately 4.5 months higher than KC, which is about .6 months higher than AHC-L.

When the two conventional and consistently administered measures most closely related to school success (Binet and PPVT) are compared suggestive trends appear. A year of school experience does not change the generally stable Binet I.Q. from its status at the end of a year of regular school for either the combined Study I and II EPS or KC children, but the at-home control children showed large mean gains in Binet I.Q. At the end of the first grade, EPS was significantly higher than KC in mean Binet and higher than AHC, but not significantly so. The same pattern existed for PPVT means, but the difference among groups was not statistically significant.

The groups are drawing closer together in language, then, while retaining most of the posttest Binet I.Q. differential. While combined EPS Binet means for the collapsed groups are almost the same at F^1 as at posttest, F^1 PPVT means were lower both for each group considered separately and for the two groups combined. Combined KC Binet I.Q. means do not change from posttest to F^1 but, for the PPVT, both groups gain an average of about five points from posttest to F^1 . AHC groups, separately and combined, show large posttest to F^1 gains on both Binet I.Q. and PPVT quotient.

It may be argued from these trends that the public schools are maintaining the over-all general experimental and learning stimulation level necessary to "hold" the Binet I.Q. level reached at the end of a special or traditional kindergarten experience. However, the public school curriculum is inadequate for maintaining the accelerated rate of growth that had been shown during the preschool year. On the otherhand, the public school is sufficiently enriching to pull up the mean I.Q.s of the hitherto severely understimulated AHC children so that, at the end of the first grade, they do not differ significantly from either the EPS or KC children.

The picture for language, probably a more sensitive reflection of school experience than I.Q., is very different. The EPS children entered school following an extremely active year of two-way communication between them and the teachers. They entered a situation where one-way communication is the rule. Consequently, they show mean decreases in PPVT and decelerated progress on the ITPA from the time of school entrance to the end of first grade. The KC children were more conventionally taught; therefore, during their preschool year, and during first grade, they tended to receive one-way instruction, from teacher to child. The substantive nature of first-grade experiences--the specific, goal-directed activities toward which they were set--were, however, still sufficient that they continued the relatively accelerated slope of language gain shown in their kindergarten year (although the rate of gain decelerated).

The school was a new world to the AHC children. Any environment rich in communication, whether mutual or one-way, was sufficiently richer than any they had previously experienced. As a result, their language development spurted such that, at the end of first grade, their language quotients did not differ significantly from either the EPS or KC children.

Motor Development

Hypothesis II predicts that the follow-up status of the three treatment groups in Fine Motor scores will be EPS ∇ KC ∇ AHC. This prediction is based on the assumption that the homes of psychosocially disadvantaged children are singularly deficient in opportunities to develop fine motor skills, such as work with pencils and scissors. This deficiency is thought to be as great as for language, and to constitute an additional handicap to later regular school attendance.

The prediction for Gross Motor scores was EPS = KC = AHC. The assumption that lay behind the prediction was that disadvantaged environments permit sufficient opportunity to run, play, and climb that school experience, whether EPS or KC, will not accelerate disadvantaged children significantly more than will their regular home environments. It may actually be that they are permitted more freedom to engage in unsupervised, free, running- and climbing- types of play than otherwise more favorably situated children. However, as has been mentioned, a small comparison study indicated that the Ss of the present study were significantly disadvantaged in gross as well as fine motor skills when compared with middle class children of the same age.

The Hypothesis II prediction for Total Motor scores is the same as for Fine Motor: EPS ∇ KC ∇ AHC. This prediction is based solely on the contribution made to Total Motor scores by the Fine Motor subtests.

It will be recalled that attempts to assess motor development during Study I failed, since the instrument employed consisted predominantly of gross motor items. The Lincoln-Oseretsky Motor Development Scale (L-O) was introduced for Study II and continued for Study III. Thus, only a single F^1 set of results is available (for the Study II groups at the end of first grade). Results from this assessment are included in Table 42 below.

Table 42

Group	N	Fine				Gross				Total							
		Pretest		Follow-up 1		Gain	Pretest		Follow-up 1		Gain	Pretest		Follow-up 1		Gain	
		Mean	S.D.	Mean	S.D.	Adj. Mean	Mean	S.D.	Mean	S.D.	Adj. Mean	Mean	S.D.	Mean	S.D.	Adj. Mean	
EPS ₂	15	11.80		21.53				7.53		18.33			19.33		39.80		42.82
KC ₂	16	16.94		29.62				8.94		19.06			25.88		48.69		46.32
AHC ₂	11	16.73		25.36				7.09		17.45			23.82		42.82		42.15

At F^1 , there are differences either for Fine, Gross, or Total Motor scores. It will be recalled that EPS_2 entered school significantly superior to KC_2 , and KC_2 began school significantly better in Fine Motor scores than AHC. These differences have completely disappeared at the end of the first grade, suggesting either that compensation for deficiency in fine motor skills can be as easily made from six to seven as from five to six years of age; or that the schools failed to provide stimulation sufficient to maintain the advantage additionally held by the EPS and KC groups.

Academic Achievement

It follows logically from the Hypothesis II predictions about F^1 and F^2 status on measures of intelligence, language and motor (particularly fine motor) skills, that the prediction of status in school (readiness for school as judged by administrators and teachers, regular grade placement, and adequacy of achievement within that grade) is as follows: $EPS > KC > AHC$.

Considerable reliance was of necessity placed on teachers' and peers' judgment of academic and personal-social status at the end of the first regular school year following the intervention treatment (F^1). Rough though these criteria may be, they are the "real life" measures against which the long-time effectiveness of the intervention program must be judged.

The first question one asks about such a population is this: "How did the schools judge the children's readiness for school?"

Figures for general school status at the end of the first regular school year following intervention are summarized in Table 43 for Studies I and II, and for the collapsed groups.

From Table 43, it can be seen that there are no real differences in school readiness among the Study I experimental and contrast groups, as judged by teachers' and administrators' opinions about readiness for school. Interpretation of this finding is clouded by the fact that the public school system into which the EPS and AHC-L groups went was larger and more sophisticated than the one which ministered to the KC group, or the three which were attended by the AHC-D children. For instance, the Bloomington school system had both kindergartens and special classes, the four small school systems had neither.

The picture is more favorable for the EPS and KC children enrolled in Study II. The one EPS child not in school was kept out because of tragic family circumstances rather than lack of readiness for school, and the other two children not in regular first grade were considered eligible for kindergarten (although this was a half day kindergarten meeting only twice a week in the case of the KC boy).

Twenty-five percent of the Study II AHC children did not enter first grade because they were judged not ready for school; in addition, one child was placed in a special class for the retarded. Over-all, however, the results from this crude index of effectiveness of the intervention program, while favoring some type of preschool experience, are not impressive.

Table 43
School Placement Status for Study I and II Subjects
One Year After Intervention

Group	N	Regularly Enrolled 1st Grade	Enrolled, Kinder- garten	Special Class for Retarded	Not in School	Percent in Regular Placement
EPS ₁	13	11	0	1	1 ^a	85.4
KC ₁	13	11	0	0	2 ^b	85.4
AHC-L ₁	14	13	0	0	1 ^c	85.7
AHC-D ₁	13	11	2	0	0	85.4
EPS ₂	16	14	1	0	1 ^d	87.5
KC ₂	16	15	1	0	0	93.8
AHC ₂	16	11	0	1	4 ^e	68.8
EPS _{1,2}	29	25	1	1	2	86.2
KC _{1,2}	29	26	1	0	2	90.0
AHC _{1,2}	43	35	2	1	5	81.9

^aTeacher advised that one girl was not ready for school.

^bTeacher advised against school for one boy and one girl because they were not ready for school.

^cOne girl judged not ready for school by teacher.

^dThis boy was removed from home because of extreme violence and death in home. Given an out-of-school year to adjust to foster home.

^eThree boys considered not ready for school by teacher. A fourth boy said by teacher to be "going blind", diagnosis not medically substantiated.

Table 44 summarizes similar data for Study I children at the end of their second year following the intervention treatment (F²).

It can be expected that the children will have "firmed up"--i.e., been more stably categorized--at the end of second than at the end of first grade.

As judged by this criterion, no lasting effects of the intervention program (EPS) can be inferred, and regular kindergarten (KC) experience seems if anything to be less effective than the AHC-L year. This conclusion must be viewed in light of the fact that the EPS and AHC-L children attended a larger and more sophisticated school system (Bloomington) than the KC and AHC-D children. For these last two years, the only alternatives for children are exclusion from school, placement at grade level, or retention in the same grade. Even so, fewer KC children progressed regularly through their rather limited school systems than did the AHC-D children.

At the end of the first year of school attendance, teacher judgments were obtained for five academically related variables. Teachers were requested to indicate whether the school year's performance was satisfactory (S) or unsatisfactory (U). These marks cannot be said to have been made blind, as in the small towns where the children attended school, there was considerable familiarity with the study. Some teachers probably knew which children were EPS, which were KC, and perhaps which were AHC. However, no indication of such status was given at the time teachers were asked for their evaluations.

(1) The first criterion was total number of satisfactory (S) marks at the end of the school year. These encompass marks in Educational, Cultural, and Social Growth.

(2) The second criterion was total number of satisfactory marks for Educational Growth alone at the end of the school year.

(3) The third criterion was the teachers' rating on a 8-point scale of reading status at end of the first year of school (from the second reader of the second grade [8] to the first pre-primer [1]).

(4) The fourth criterion was a teacher paired-comparison for all children in their classes on the variable of reading skill. Each child was judged superior to (+), equal to (0), or inferior to (-) every other child. The scores were transformed to percentages of total possible score so as to permit cross-group comparisons.

(5) The fifth criterion was a similar paired-comparison of numerical skill for all children obtained from the teachers.

Since the teacher paired comparison technique for Reading, Number Skills, and Personal-Social Development was an important aspect of F¹ and F² data, it was necessary to obtain estimates of the reliability of the technique. A random sample of 15 teachers was asked to repeat the process three to four weeks after their initial judgments. At the time of their first comparisons, the teachers did not know that they would be

Table 44
School Placement Status for Study I Subjects
Two Years After Intervention

Group	N	Second Grade	Interim (First and Second Grade) ^a	First Grade	Special Class for Retarded	Percent in Regular Placement
EPS ₁	13	6	3	3	1	46.2 (69.2) ^a
KC ₁	13	5	0	8	0	33.5
AHC-L ₁	14	10	1	3	0	71.4 (78.6) ^b
AHC-D ₁	13	6	0	7	0	46.2

^aSpecial provision was made in the larger and more sophisticated school system for these children to study both in first and second grades. The percentage in parenthesis includes these children as regular placements.

asked to repeat them. The scores for all the children in each class were used (No's ranged from 13 to 35) and Pearson-Product-Moment Correlation coefficients between first and second comparisons were computed for each of the 15 teachers. The correlation coefficients obtained ranged from .71 to .97 when the teachers were rating Personal-Social Development, from .86 to .98 when rating Reading, and from .93 to .99 for Numerical Understanding. Nineteen of the 25 correlation coefficients for total Personal-Social Adjustment, Reading, and Number skills were respectively: .91, .96, and .94.

Table 45 includes all teacher judgment data for Study I and Study II children considered separately, and for the two Studies collapsed.

F¹ for Study I. There were no significant differences in any of the five teacher judgments of academic achievement for the four groups in Study I. Indeed, in order from first to fourth rank, AHC-L rather than EPS occupied the first position in four of the five measures. EPS ranked first in only one (numerical paired comparison), although it excelled KC in rank in all five teacher judgments. In turn, KC excelled AHC-D for all five criteria.

In view of the nature of the basic data and the large and sometimes erratic variances, Mann-Whitney U tests were run on the paired-comparisons data. Only numerical status yielded a significant U. This indicated that $EPS = KC > AHC-D$.

F¹ for Study II. The picture differs for Study II children at the end of their first year. For each of the five measures of academic achievement the relative standings were EPS first, KC second, and AHC third. The results of the statistical comparisons are shown below:

Total S marks on Report Card:	$EPS > KC > AHC$
Total S marks in Educational Growth:	$EPS > KC = AHC$
8-Point Reading Scale:	$EPS > KC = AHC$
*Paired Comparison: reading	$EPS = KC = AHC$
*Paired Comparison: numerical	$EPS = KC = AHC$

F¹ for Studies I and II Combined. When Studies I and II were combined, only one significant difference remained. On Total Satisfactory Academic Marks the EPS groups excelled both KC and AHC which, in turn, did not differ from each other. As far as rank is concerned, EPS occupied first rank for all five of the measures, but AHC rather than KC (as predicted) ranked second in four of the five.

Parenthetically, it is interesting to note that significant differences

*These were analyzed by the Mann-Whitney U test.

Table 45

Teacher Judgments of Academic Status, Follow-up 1 for
Studies I and II, and Studies I and II Combined

Group	N	Total Satisfactory Report Card Marks		Total Satisfactory Marks Educational Growth		Mean Rating 8-Point Reading Scale		Reading Paired Comparison		Numerical Paired Comparison	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS ₁	11	15.82	3.97	7.45	2.84	3.54	2.02	42.46	27.50	49.91	28.60
KC ₁	11 ^a	12.20	8.04	6.45	4.30	3.50	1.71	40.82	21.62	47.36	24.70
AHC-L ₁	13 ^b	16.83	4.73	9.08	2.56	4.62	2.06	45.69	23.63	42.31	19.91
AHC-D ₁	13	11.38	7.69	4.69	4.80	2.69	2.36	35.46	30.71	36.54	29.79
EPS ₂	13 ^c	16.00	4.80	7.15	3.65	4.42	1.56	37.46	31.24	40.09	24.42
KC ₂	16	9.94	5.65	3.38	3.76	2.00	1.00	21.75	17.46	20.44	14.41
AHC ₂	13 ^d	6.23	3.22	1.92	1.85	1.85	0.99	18.75	21.60	20.08	22.54
EPS _{1,2}	24	15.92	4.34	7.29	3.24	4.00	1.81	39.96	28.83	45.00	26.85
KC _{1,2}	27	10.82	6.49	4.63	5.23	2.60	1.55	29.15	21.45	31.81	23.52
AHC _{1,2}	39	11.44	6.87	4.20	4.40	3.05	2.19	33.68	27.38	33.32	25.62

^aN = 10 for Total Satisfactory Marks, and Reading and Numerical Paired Comparisons.

^bN = 12 for Total Satisfactory School Marks.

^cN = 12 for 8-Point Reading Scale.

^dN = 12 for Reading and Numerical Paired Comparisons.

among groups more often occur for S Marks than for the highly reliable teachers' paired comparisons. There are probably two reasons for this: first is the higher variance of the paired-comparison means. Second is that, when assigning marks to an individual, the teachers may be comparing the child relative to himself rather than relative to the class. On the other hand, for paired comparisons, only status relative to the class is considered.

F² for Study I. Only Study I children had completed second grade at the time this report was written. Two teacher judgments of academic progress were obtained for them at the end of their second year of school. These are summarized in Table 46.

The F-ratio fails to reach significance for either comparison. The AHC-L group continues to rank first, as it had for the Study I children at F¹; the EPS group ranks second, the KC group third, and the AHC-D group fourth.

Standardized tests of academic achievement were not given at F¹ because of their unreliability for first grade, as well as their unpopularity with the teachers and administrators of the schools involved in the study. However, they were individually administered to all Study I children at the time of F². Table 47 summarizes Total Reading and Total Numerical scores for the California Achievement Test, Form W. These scores are broken down into their component parts in Table 48.

While means for these groups order themselves according to expectancy, differences do not reach significance. Except for the position of AHC-D in the rank ordering, the results from the standardized achievement tests are uncorrelated with the teacher judgment data reported in Table 46. Results (F¹ and F², Academic, cont. p. 22).

The subtests for Reading and Arithmetic also fail to show significant differences among the groups, although the groups with preschool experience show consistent higher rank order than the two non-intervention groups.

The results from F¹ for Studies I and II are mixed. Study II, it is clear, presents unequivocal support of Hypothesis II. Study I does not. It can only be concluded that further follow-up data are required before the hypothesis can either be clearly accepted or rejected.

Results from the Study I, AHC-L group are particularly interesting, as it will be remembered that this group was that portion of the pool of Ss from Bloomington assigned at random to the AHC-L condition, the other half of the pool going by the name process of random assignment into the EPS group. These groups may then be considered to be closest together as far as their major life variables are concerned.

This might be taken to indicate that, given a superior public school system, intervention experiences to compensate for psychosocial deprivation are unnecessary. This does not necessarily follow since: (1) personal-social advantages of the EPS children were clearly demonstrated; and (2)

Table 46
Teacher Judgments of Academic Status,
Follow-up 2 for Study I

Group	N	Total Satisfactory Marks		Total Satisfactory Marks, Educational Growth	
		Mean	S.D.	Mean	S.D.
EPS ₁	11	15.64	6.62	8.00	3.69
KC ₁	13	15.31	6.43	7.77	3.92
AHC-L ₁	14	15.93	6.56	8.36	4.18
AHC-D ₁	13	12.38	6.02	5.69	3.52

Table 46
Teacher Judgments of Academic Status,
Follow-up 2 for Study I

Group	N	Total Satisfactory Marks		Total Satisfactory Marks, Educational Growth	
		Mean	S.D.	Mean	S.D.
EPS ₁	11	15.64	6.62	8.00	3.69
KC ₁	13	15.31	6.43	7.77	3.92
AHC-L ₁	14	15.93	6.56	8.36	4.18
AHC-D ₁	13	12.38	6.02	5.69	3.52

Table 47

California Achievement Test Follow-up 2 Data on
Total Reading and Numerical Grade Level for Study I

Group	N	Total Reading		Total Numerical	
		Mean	S.D.	Mean	S.D.
EPS ₁	10	2.13	0.71	2.04	0.51
KC ₁	11	1.98	0.56	2.01	0.53
AHC-L ₁	13	1.91	0.51	1.77	0.48
AHC-D ₁	13	1.61	0.37	1.54	0.66

Table 48
California Achievement Test Follow-up 2 Data on
Reading and Numerical Subtests Grade Level for Study I

Group	N	Reading Vocabulary		Reading Comprehension		Arithmetic Reasoning		Arithmetic Fundamentals	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS	10	2.16	0.71	1.78	0.87	1.83	0.34	2.49	0.93
KC	11	2.00	0.66	1.80	0.33	1.96	0.48	2.07	0.63
AHC-L	13	1.93	0.56	1.63	0.80	1.72	0.42	1.92	0.72
AHC-D	13	1.60	0.39	1.56	0.61	1.56	0.60	1.58	0.73

one-third of the AHC children for Study II, where results are so consistently in line with Hypothesis II, are Bloomington children.

Experimental children from the Indiana Project were almost exactly equal to Weikart's Ss in reading, and superior to them in numerical skills. The AHC-L Indiana children slightly excel Weikart's at-home control in reading, while the AHC-D children fall very slightly below them. For numerical skills, both AHC groups exceed Weikart's comparable group. Since Weikart did not include a kindergarten group in his study, no direct comparison of the present data with the Weikart data is possible. However, in numerical skills the Indiana KC group substantially exceeded Weikart's experimental group and, of the two AHC groups in the Indiana Project, the AHC-L children stood higher in numerical skills at the end of the second grade than did Weikart's experimental group, and the AHC-D group was slightly higher (see Table 49).

As has been mentioned, the school performance of the Study I EPS children through second grade remains puzzling. For this group, the most usually successful predictors of school success (intelligence and language quotients) fail to correlate with school achievement, whether judged by teachers or by objective measures of achievement such as the California Achievement Test. Has the EPS experience raised them, formally, to the level of normal children, yet made them underachievers?

This suggests to the investigators that an intervention program limited to school is insufficient to guarantee later school success, even though it profoundly affects the formal predictors of success. At the end of second grade, the EPS children--essentially normal in intelligence--are achieving almost a year behind expected grade level. They are achieving better than the other study groups, but not significantly so. It may be that this retardation in school performance is a function of non-intellective rather than intellective factors. Thus, home intervention while probably useful in the intellective area is essential in ameliorating the attitudes and other non-intellective factors that are necessary for school success.

Personal-Social Adjustment

Prediction from Hypothesis II is that ranking on assessments of personal-social status in regular school settings will be: EPS > KC > AHC. Since data for personal-social status during the preschool treatment periods are meager, prediction from posttest standing to F¹ and F² status does not rest on as solid ground as predictions made earlier in this follow-up status section. As has been mentioned, sociometric status in the EPS and KC groups did not provide data permitting predication. The limited data for Intensity of Task Involvement, however, provide some "foundation" intervention period data for making directional predictions for personal-social elementary school status.

F¹ for Study I. At F¹ the teachers were asked to do a paired-comparison ranking of each child in their rooms against every other child for Personal-Social Development (Adjusted). These scores were treated

Table 49
California Achievement Test
Mean Percentile Data Comparison Between Indiana Project Study I Groups
and Perry Project Wave O Groups

Group	N	Total Reading			Total Numerical			
		Indiana Project	Perry Project		Indiana Project		Perry Project	
		Mean Percentile	N	Mean Per- centile	N	Mean Per- centile	N	Mean Per- centile
EPS ₁	12	24	13	23	12	28	13	17
KC ₁	13	13	--	--	13	28	--	--
AHC-L ₁	13	9	15	4	13	21	15	5
AHC-D ₁	13	2	--	--	13	9	--	--

statistically as described above for Reading and Numerical Paired Comparisons. Teachers were also asked to indicate the number of satisfactory (S) marks for Cultural Growth and Social Growth.

Sociometric ratings from the children in each class attended by one of the Study Ss were also secured. Each child in every room listed his three best friends in order as well as the three children he least preferred. In sum, five social personal judgments were obtained at F^1 . These were:

- (1) Total satisfactory (S) marks assigned by the teachers at the end of the first grade for Cultural Growth.
- (2) Similar S marks for Social Growth.
- (3) Teacher paired-comparisons of personal-social adjustment with the children in the class.
- (4) Children's sociometric choices of preferred classmates (prefer).
- (5) Children's sociometric choices of least preferred classmates (reject).

Table 50 summarizes the teacher data for F^1 for the Study I and II children, and for the two studies combined. Table 51 follows the same format for the pupil sociometric criteria.

For teacher paired-comparisons of personal-social adjustment for the Study I groups F-ratio reaches significance at less than the .05 level. The EPS group is significantly better adjusted judged by the teachers than either KC or AHC-D groups. The AHC-L group, which is intermediate, does not differ significantly from either EPS or AHC-D, but is significantly higher than the KC group.

F^1 for Study II. Results according to this criterion approach but do not reach significance ($F = 3.02$) for Study II. The Study II groups are ordered with EPS ranking first, AHC second, and KC third.

F^1 for Studies I and II Combined. When Study I and II populations are combined, the F-ratio of 7.65 is significant. Further analyses by Mann-Whitney reveals significant superiority of EPS over KC, but other differences are not significant.

Total Satisfactory (S) teacher marks for Social Growth is significant for the Study II groups, and for Studies I and II combined. EPS is superior to both KC and AHC, a pattern which also occurred (but non-significantly) among the Study I groups.

There are no other significant differences for the three measures among the Study I or II groups considered separately, and F fails to reach significance for the collapsed groups for S marks in Cultural Growth, although EPS has the highest and AHC the lowest mean.

Table 50

Teacher Judgments of Personal-Social Development
Follow-up 1 for Studies I and II, and Studies I and II Combined

Group	N	Total Satisfactory Marks Cultural Growth		Total Satisfactory Marks Social Growth		Personal-Social Teacher Paired-Comparison	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS ₁	11	3.27	1.10	5.09	1.58	70.09	24.90
KC ₁	11	2.45	1.69	3.18	2.48	36.91	25.80
AHC-L ₁	13	3.23	1.01	4.46	2.26	56.31	21.34
AHC-D ₁	13	2.46	1.45	4.23	2.39	42.31	28.83
EPS ₂	13 ^a	3.38	0.87	5.46	1.61	48.18	25.32
KC ₂	16	3.06	1.39	3.50	2.16	25.19	16.33
AHC ₂	13 ^b	2.31	1.38	2.00	1.68	36.92	30.73
EPS _{1,2}	24	3.33	0.96	5.29	1.57	58.17	26.73
KC _{1,2}	27	2.81	1.52	3.37	2.25	29.96	21.08
AHC _{1,2}	39	2.67	1.32	3.56	2.36	45.40	27.68

^aN = 11 for teacher paired comparison of popularity.

^bN = 12 for teacher paired comparison of popularity.

Table 51
Sociometric Data for Follow-up 1
Studies I and II, and Studies I and II Combined

Group	N	Preference		Rejection	
		Mean	S.D.	Mean	S.D.
EPS ₁	11	3.09	3.59	9.27	9.27
KC ₁	10	4.60	4.35	11.20	7.50
AHC-L ₁	11	5.36	6.22	7.91	5.92
AHC-D ₁	13	2.00	6.07	16.54	13.89
EPS ₂	13	6.54	6.09	8.08	8.63
KC ₂	16	4.69	5.06	13.94	12.25
AHC ₂	11	3.91	5.58	10.45	11.67
EPS _{1,2}	24	4.96	5.30	9.50	8.90
KC _{1,2}	26	4.65	4.71	12.88	10.59
AHC _{1,2}	35	3.56	5.91	11.91	11.51

In Table 51 are summarized social status as judged by classmates on preference and reject sociometric variables.

None of the results for either sociometric criterion for Study I, Study II, or Studies I and II combined is statistically significant. It, therefore, appears that there is little agreement between the personal-social adjustment rating made by the teachers and popularity among pupils. However, the fact that the teachers perceive the social adjustment of the EPS group to be good, may result in greater teacher tolerance of the EPS children. This may produce a significant school achievement differential favoring the EPS group in later grades.

F² for Study I. The same measures as used to assess personal-social status at F¹ were employed at the end of the second school year (F²). Table 52 summarizes results from the teacher judgments, and Table 53 summarizes those from the sociometric peer nominations for preferred and rejected classmates.

There are no group differences for S marks for either Cultural or Social Growth, although the mean scores for Social Growth of the two pre-school groups are higher than those of the two AHC groups. The F-ratio approaches significance ($F = 3.40$, F required for significance at the .05 level for 3 and 41 d.f. - 3.46) for teacher paired-comparison judgment of personal-social adjustment. As at F¹, the EPS group ranked highest on this variable, followed by the AHC-L.

Classmates' judgments about neither preference nor rejection revealed significant differences among the groups at the end of their second school year. However, it is interesting to note from Table 53 in contrast to Table 50 for personal-social status at F¹ that the AHC groups have not changed on the whole as far as either preference or rejection status is concerned (AHC-L shows more rejection and AHC-D more popularity and less rejection). On the other hand, the two pre-school groups (EPS and KC) have changed slightly in the direction of being more rejected, but strikingly in the direction of being more accepted. This possibly reflects increasing interaction of the EPS and KC children with their respective classmates.

Table 52
Teacher Judgments of Personal-Social
Status, Follow-up 2 for Study I

Group	N	Total Satisfactory Marks Cultural Growth		Total Satisfactory Marks, Social Growth		Personal-Social Development Teacher Paired-Comparison	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
EPS ₁	11 ^a	3.00	1.61	5.18	1.66	69.30	25.63
KC ₁	11	3.18	1.33	5.27	1.35	45.91	26.55
AHC-L ₁	13 ^b	3.23	1.30	4.69	2.36	53.36	26.28
AHC-D ₁	13	2.92	1.32	3.77	2.28	38.00	17.78

^aN = 10 for Popularity, Teacher Paired-Comparison

^bN = 11 for Popularity, Teacher Paired-Comparison

Table 53

Sociometric Data, Follow-up 2 for Study I

Group	N	Preference		Rejection	
		S.D.		Mean	S.D.
EPS ₁	11	9.09	8.47	12.45	17.39
KC ₁	11	10.00	10.26	12.91	9.72
ACH-L ₁	13	5.31	8.75	10.08	10.62
ACH-D ₁	13	4.38	4.84	11.15	7.05

DISCUSSION

Several major issues have already been discussed in detail in the Results chapter. Such points discussed previously will only be summarized in this chapter; factors not previously covered will be discussed in greater detail.

Curriculum

The major purpose of the Indiana Project was to demonstrate the greater effectiveness of specific diagnostic teaching and curriculum strategies over traditional kindergarten practices. For this reason, a regular kindergarten contrast group in addition to a traditional home contrast group, was included as part of the project design. The overall goal of the study also precluded formal home intervention procedures.

With the exception of specifically developed diagnostic language and fine motor lessons, the experimental curriculum included many of the kinds of activities such as music, art, physical education, free play, and story telling, found in regular preschool and kindergarten programs. However, the manner in which these activities were employed in the Indiana Project differed from traditional preschool programs. They were treated as adaptive art, physical education, rather than being used as ends in themselves. In the Indiana Project, every activity was used for the development and remediation of the specific cognitive (intellectual and language), psycho-motor (fine and gross motor), and affective (personal-social) behavior of individual children. In traditional programs, such activities are generally used as ends in themselves without regard to the specific deficits or needs of the children.

The superiority of the Indiana Project diagnostic curriculum strategies was clearly demonstrated for the cognitive indices of general intelligence and language; less clearly shown for fine motor development; and clearly indicated for the affective indices of task involvement and personal-social adjustment as viewed by first and second grade teachers.

It is extremely important to emphasize that the curriculum and teaching strategies used were more important than the packaged lessons developed for the project used alone. This was vividly demonstrated during the course of Studies I, II, and III, when it was found that the formal language lessons per se were not as effective in improving language performance as the total language program (formal lessons plus ancillary language activities).

Diagnostic Techniques

The Indiana Project was guided throughout by the goal of developing curriculum components and teaching strategies consistent with the authors' interpretation of the union of two historic streams in psychology. These two streams are represented by (1) the correlation approach which studies variance among people and (2) the experimental approach which studies

variance among treatments. The union of these two streams leads quite naturally to a study of the interaction of the treatment with what is known about the individual in order to make practical decisions concerning what can, indeed must, be done, to enable people to fulfill life goals.

The possibilities of developing a useful union of the experimental and correlational approaches depends on two major factors. The first depends on how well the designer of treatments can "know" the individuals with whom he works. The second is related to how well the treatments match the known characteristics of the individual.

How well the individual can be known by an outsider depends upon the power and inclusiveness of the assessment techniques available to him and how well the appropriate information can be elicited from the person to be known. It is important, therefore, to discuss (1) the instruments used in the Indiana Project, and (2) the problems of eliciting information from young disadvantaged children.

Standardized Instruments. A total of 18 standardized instruments were tried in various stages of the three studies within the Indiana Project. Each instrument was chosen because of its potential contribution to an understanding of some aspect of cognitive, effective, or psychomotor behavior. The investigators realized that many of the instruments chosen had previously been shown to have relatively high intercorrelations and, therefore, would yield little additional knowledge concerning individual children for the total range of a standardization population. However, it was assumed (or hoped) that for the children involved in the study (who, as a group, represented the lower end of the continuum upon which most of the tests were standardized) these instruments would yield clues about the differential disabilities and strengths existing among the children.

During the progress of the Studies some tests were discarded because they failed to differentiate among these particular children and added little, if anything, to the knowledge of individual. These tests included the Purdue Perceptual-Motor Development Scale, the Goodenough-Harris Draw-A-Man, and the Raven's Colored Progressive Matrices. Some tests were added in an effort to increase the understanding of individual children. These included a reversal of the manner in which the PPVT was administered, the use of the Stanford-Binet Vocabulary Test administered independently of the regular-Binet administration, the San Francisco Inventory of Communication Effectiveness, and the Hodges-McCandless Task Involvement Scale.

Some instruments were included and maintained throughout the three studies for purposes which were relatively independent of the total score which they yielded. For example, the Columbia Mental Maturity Scale (CMMS) was not chosen primarily for its measurement of intellectual status, but because it provided an opportunity to examine a child's response to a task quite different from other measures of intelligence. As a matter-of-fact, inferences concerning the perceptual and language

abilities were made on the basis of the CMMS.

It is interesting to note the results from the two most regularly used instruments included in the study--the Stanford-Binet and the Peabody Picture Vocabulary Test (PPVT). Correlations between these two tests at pretest time were .34, .56, and .60 for all children in each of the Studies (I, II, and III) respectively. On the average, the Binet I.Q. score was 16.7 points higher than the PPVT for 96 children (63 percent of the 152 initially involved in the project). In 34 percent of the cases, the PPVT exceeded the Binet (mean differences was 11.5 points). The overall average discrepancy score of 6.9 points in favor of the Binet. The over-all correlation of the Binet with the PPVT was .46. The PPVT is a much more variable test than the Binet, for this population as indicated by the standard deviations of 19.6 and 9.0 respectively.

Motor Development Scale (L-O). Fine and Gross Motor skills resulted in a reduction of the reliability coefficient for each of the subscores. However, from all analyses where significant differences were obtained there were significant differences on the Total as well as Fine Motor skills, but no differences for the Gross Motor scores. It appears that the division of Total scores into the two subscores did not seriously affect the reliability of the differences. The correlations of Fine, Gross, and Total (L-O) scores with the tests of cognitive functioning (such as the Binet, PPVT, ITPA, and CMMS) were low, ranging from -.003 to .40. Only one differed significantly from zero. Certain subtests of the Illinois Test of Psycholinguistic Ability (ITPA) correlated relatively highly with the L-O. These were: Visual Motor Association, Visual Motor Sequencing, Vocal Encoding, and Visual Decodive. As judged by their titles and the appearance of the items, these correlations are logical. These results suggest that the use of the Lincoln-Oseretsky provided differential information that was helpful in developing curriculum procedures for modifying obvious deficits in fine motor skills. These deficits were even more striking when the psychosocially deprived children were composed to middle-class children of the same chronological age (Middle Class Total - 53, Gross - 21, Fine 21; Project children Total - 20, Gross 7, Fine 13).

Problems of Eliciting Responses from Young Psychosocially Disadvantaged Children. The problems associated with testing young children are well summarized by Terman and Merrill (1960, p. 53). "Because of the special problems involved in dealing with young children in a test situation, preschool testing requires its own technique. Young children do not easily become absorbed in an externally imposed task; their attention is easily distracted and they are quickly fatigued. Their responses are likely to be influenced by hunger, restlessness, desire to please the examiner, timidity, and a hundred other motives and circumstances."

Add to these general problems the more specific problems of testing low-functioning, culturally-disadvantaged children, even of the majority race in this country, and the problems of initial testing become enormous.

These children (the psychosocially disadvantaged) possess a variety of attitudes, values, and behavioral patterns that, although likely to be appropriate in their unique co-culture, often hinder their test performance. Many of the standard techniques for developing rapport, maintaining interest, and eliciting responses are totally inadequate for the task at hand.

Included among the attitudes, values, and behavior patterns of the disadvantaged that may be exhibited in a testing situation are increased fearfulness, restricted range of coping behaviors, exhibition of incongruent attitudes and behaviors in attempts to cope, anticipations of unpleasant outcomes from the strange adult, extreme withdrawal with accompanying refusal to talk, and crying or similar responses which the child has learned when dealing with similar adult figures.

The naive examiner who responds to the negative initial attitudes of the child by terminating the testing session has probably made a serious error. The child has now learned at least one successful way of managing to reduce his discomfort and it may be twice as difficult to engage him in similar tasks in the future. Even the examiner who breaks down the disadvantaged child's initial wall of fear may find, or be able to infer, that he is now perceived as a punitive authority figure.

Due to the initial lack of test motivation among deprived children, the selection of appropriate rewards and punishments is of central importance. The examiner's smiles of approval and encouraging comments have little meaning for many disadvantaged children. Their learned expectancies are geared more to the avoidance of punishment than to the search for reward. It is important to remember, however, that there is great variability among the home environments of these children. Thus, any general statement concerning reward and punishment is likely to be misleading. The major admonition that can be made is that the consideration of the home environment is crucial when attempting to apply motivational devices.

The nature of the test content itself may affect the child's motivation. Many standardized instruments used in the Indiana Project (such as the Binet and the ITPA) involve verbal interaction. Apparently, tasks involving verbal skills and/or materials foreign to the disadvantaged child are unpleasant to him. There is some hint in the item analysis of the pretest Stanford-Binet that those items involving longer verbal stems and longer verbal responses are more difficult for the project children than for the standardization sample. Another good example of such difficulty is the Stanford-Binet item that requires the child to draw a line indicating the shortest route to a designated point. For some youngsters, the primary problem is selecting the appropriate route. For the disadvantaged youngster, the primary problem may be manipulation of the test materials and pencil. Therefore, it is evident that type of test item interacts with experiential background in predicting success or failure.

Deficits in language pose many problems for the child in a testing

situation. He may be unable to follow many of the directions, is likely to be quite frustrated with sentence completion tasks, and has no clue as to how to respond to vocabulary items. Another problem in testing sub-cultural groups is seen in tests like the PPVT where pronunciation is crucial. The examiner who is intent on correct pronunciation may put the deprived child at a distinct disadvantage. For the Indiana Project sample, the most difficult words were gerunds. It may be that the "ing" endings are particularly distorted by local dialects in subcultural groups. The examiner interested in assessing the deprived child accurately should be familiar with the dialect of the children with whom he is working and be able to mimic when necessary.

In view of the difficulties and suggestions made above, it is obvious that initial test data collected from the responses of deprived children are probably best thought of as minimal estimates of functioning at that time. The social context of the testing situation is indeed a crucial problem for the would-be-assessor of the strengths and deficits of disadvantaged groups.

Subject Selection and Attrition

The immense difficulties in matching schools and filling out a sample so as to approximate a satisfactory research design could have been avoided had the investigators chosen to conduct this study in an urban area. Indianapolis, for example, with its large population of disadvantaged youngsters, both Negro and white, would have been easily accessible.

However, no study has dealt with small towns and semi-rural disadvantaged children. Federally sponsored programs for rural development have not met with success. The serious consequences to the cities of in-migration of psychosocially disadvantaged families from Appalachian (of old white stock) and from the rural South (of Negro farm laborers) have been so fully documented by sociologists and educators as to need no further mention here. The authors hoped this study would be more directly related to this problem than the more frequent inner city and urban ghetto studies have been. For this reason, they undertook the special design and sampling problems inherent in studies conducted in small town and semi-rural settings.

Problems of Locating Subjects

Since the intent of the Indiana Project was to study psychosocially disadvantaged children as opposed to more generic economically deprived children (e.g. Head Start criteria based on family income alone), procedures for locating such children had to be developed. It became increasingly apparent that few social agencies kept an adequate census of psychosocially disadvantaged families. The reason for this inadequacy appeared to be related to the fact that small town social service agencies were more likely to provide services to the "respectable deserving poor" rather than to less respectable families containing the chronically unemployed, unwed mothers, alcoholics, or emotionally

disturbed adults. These latter types were disproportionately represented in the present study. Therefore, with the exception of children living in a few small slum pockets, subjects had to be located by a home to home, rural road by rural road canvassing procedure. After identifying a nucleus of these families, promising leads were gathered from them regarding the whereabouts of children from other families that might meet the selection criteria for the study. The project staff began with the assumption that cooperation among the families located would be difficult to elicit. This was not the case.

Families that appeared to meet the criteria of psychosocial deprivation and that included a child within the appropriate age range were contacted by the project social worker. Straightforward requests for the family's cooperation were made and a short, simple explanation of the reasons for wanting to test the child was given. The explanation included the following facts: (1) the investigators were interested in seeing how young children learned, (2) they wanted children who were going to enter school the next year, and (3) in order to see if the child was eligible, they wanted to see the kinds of things the child had already learned. In most instances, these explanations were sufficient when followed by specific details of where the child would be studied, how the child would get to-and-from the school, and issuing an invitation to the parent to accompany the child to the testing situation.

Whether or not the child met the additional criterion of testing in the appropriate I.Q. range, the staff member gave a report to the parent about how well the child had done. If the child was eligible for the project, the parent was asked if he were willing to send the child to kindergarten during the coming year. Stress was placed on how much the family would be contributing to general understanding of children, rather than on the benefits to the family. However, full descriptions were given of the provisions for transportation, hot lunches, snacks, and short field trips, as well as the fact that the child would learn many interesting things. Many parents used the excuse of inadequate clothing for declining cooperation. At this point, the project worker stressed the fact that most five-year olds did not have school clothing and that we were prepared to provide jackets and shoes when the family had not yet purchased them.

One type of delicate situation arose in the first year of the project particularly, and generally in all three studies, when a child was eligible but was not selected for kindergarten. The project staff made several errors in accomplishing the task of maintaining continuing contact with the families for follow-up testing. One error was made in initial contacts with difficult families. If the parent balked at the initial testing, he was sometimes told that the child would be able to attend a kindergarten during the coming year. Since some of these children were not selected due to high I.Q. or lack of psychosocial deprivation, the families were upset. Only careful social work and full explanation of the error to the parents avoided unpleasant consequences. Indeed, even some of the statements made to parents of excluded children resulted in difficulties for the project. At least once a parent of a child with too high an I.Q. was told that his child was too bright and did not need to attend kindergarten. Unfortunately, a neighbor child

was selected and his parents learned of the reason for the first child's rejection. Needless to say, only long discussions with the selected child's parent enabled the project to retain him.

The original Project plan was to pay the families of the at-home-contrast groups for the time they spent in preparing their child for pre- and posttesting and for participating in sociological interviews. However, after the first few offers of payment, it was shown that this strategy was met by negative attitudes from the recipients of the pay offer.

School Attendance. Two procedures used in the project were responsible for maintaining good school attendance. One of these was the house to school taxi or bus pick up service. Since the usual reasons for early awakening, such as eating breakfast or getting to work on time, were absent in many of these families, some of the children were not ready when the taxi or bus arrived. In a number of instances, the driver had to awake the child and dress him for school. Had this not been done, the poor school attendance of urban disadvantaged children often reported in the literature would probably have been duplicated in the Indiana Project.

Another procedure for maintaining adequate school attendance was the immediate follow-up by the project social worker of children who were absent for two days. These visits differed from those of truant officers in that verbal arguments about the benefits of the program for the child rather than mandatory school attendance laws were used to enlist their continued cooperation.

Attrition of Subjects. With few exceptions, urban studies with severely disadvantaged preschool children have reported extremely high rates of subject attrition. This problem was not encountered in the Indiana Project. As stated previously, this was probably due to the relative stability of the small town rural, and semi-rural Appalachian families enrolled in the project. Although moves were relatively frequently for some families, they tended to be within the community or to adjacent communities.

Influence of Associated Variables

Applied research demands controls but, by its nature, makes it very difficult to introduce them. This section of the Discussion takes up a number of variables, each of which may have influenced the results, and some of which may have influenced them consistently. An attempt is made, based at times on little formal evidence, to portray the effect that they may have had on the results.

The Teachers. Five young women took part in the present study as classroom teachers for the project, three of them in the experimental classes (EPS) using a diagnostically based curriculum, and two for the kindergarten contrast classes (KC) using a traditional curriculum. They varied widely in experience and formal qualifications, as well as in personality, teaching philosophy, identification with the school systems within which they taught, depth of commitment to the community, involvement

in compensatory education, and amount and type of previous professional experience (three of them were without previous teaching experience). Additionally, four young men were used as teacher assistants in Studies II and III, two with the EPS and two with the KC groups. They were no more homogeneous than the lead teachers.

There was an over-all significant effect by teachers for Binet I.Q. pre- posttest gain. Speaking subjectively, the two most energetically but warmly authoritarian teachers worked with the groups that showed the most Binet gain. These young women were deeply committed, efficient, and demonstrated high levels of activity. Both were exceptionally task oriented. One had had previous elementary school teaching experience, one was inexperienced. One had a young man assistant, the other worked alone. One handled a traditional kindergarten, one an experimental kindergarten group.

On the whole, however, the present authors can offer no conclusions about the influence of the teachers on the groups or about the interactions of group organization and teacher characteristics, although there is no interaction between effectiveness of teacher and types of groups (EPS vs. KC) according to Binet I.Q. change. For present purposes, this is the most important single piece of information concerning teacher effects.

The Communities. The communities were relatively homogeneous, except for Bloomington, a town of about 40,000 and the home of Indiana University. The smaller communities centered around towns ranging in population from about 2,000 to about 8,000. The towns are typical white Anglo-Saxon Protestant midwestern towns, dotted with churches, a neat business district in the middle of each, with the houses fronting the main streets well kept and surrounded by attractive lawns, trees, and shrubs. But in pockets and semi-rural areas of each lived the families of the children who took part in the present study. Their homes were one, two, and three-room shacks, for the most part, and were unpainted and in poor repair. Some had been stores, and a few were once hen-houses.

As has been said, no official community agency, including the school, was able to tell the present investigators where these houses were, or who lived in them. The necessary method of locating subjects was the "knock on every door" technique.

The families who lived in these houses, however, were known to some: the relief offices and the police knew the adults either through voluntary or involuntary contact. The teachers knew these families, also, although they had never personally visited the homes. A child from one of these homes enters school and is typically mentioned on the first day of school in the teachers' restrooms with such a statement as: "Do you know who I have in first grade this year? Another one of the Hamilton tribe!" The statement requires no elaboration for her listeners: it is a shorthand symbol for "trouble" and signals impending defeat for the comfortably complacent school system.

Bloomington is a larger town, but amazingly similar to its smaller neighbors in the sociological setting it provides for a population like

the one included in this study. If anything, it may be a more frustrating place for them to live, since the differences between their poverty and the affluence of the wealthiest citizens is more glaring, and the contrast between their semi-literacy and the intellectual sophistication of the cosmopolitan university community is more striking. The lack of zoning has produced the kind of poverty pockets in which many of the subjects of the present study live. These pockets consist of a few blocks of excessively deteriorated homes, the outer circle of which stands across the street from a subdivision populated by young faculty members and "solid citizens" of the town. Other families of the children in the study lived in rural isolation of the edges of abandoned stone quarries on the outskirts of the town, or in trailers "squatting" on unused farm land. These children are thus relatively little concentrated in homogeneous "lower class schools," as would be the case in urban ghettos or zoned towns and cities. This undoubtedly redounds to the advantage of the children academically, as they are typically enrolled in classes with "high ceilings." Research is consensual in indicating that this results in better academic achievement scores on standardized achievement tests, for low normal and borderline children than does more homogeneous grouping, as in the ghettos. This may help to explain the relatively good school performance of the AHC-L group, which lives in and attends school in Bloomington. On the other hand, this may result in poorer academic achievement as judged by teachers since the performance of the disadvantaged children is more likely to be compared to that of brighter, achieving middle class children.

Like its neighboring small towns--Bloomington is politically conservative, economically minded, particularly in such fields as welfare services and public schools, and the "town" people are as overwhelmingly white Anglo-Saxon Protestant as in the smaller neighboring towns.

The school system is more sophisticated than adjacent systems, in that there are special classes for educable mentally retarded and other handicapped children; and a flexible arrangement is possible (a limited version of the ungraded School) for some children. This flexibility has in some cases handicapped the appearance of certain results of this study: i.e., in Bloomington, EPS children were placed in such an ungraded class or in a special class rather than in their regular grade. Regular grade placement was the only alternative to exclusion from school in the small neighboring towns, at least as far as first grade pupils were concerned.

In other words, Bloomington is not strikingly different from the other towns included in the study for seriously disadvantaged children and their families.

The different towns in the study present other imponderables, the effects of which on the present results cannot be estimated. For example, as has been mentioned, one of the towns in which a kindergarten was started by the investigators has continued it as part of the regular school system, another has dropped it after the present research support was removed.

Examiner Bias. This variable has been discussed earlier. To

recapitulate, (1) at the times assessments were being made, the examiners were so busy that, by their own statement and the senior investigators' observations, they thought only of getting the job done; (2) the investigators themselves, while they hoped as citizens of the community that the diagnostically based curriculum would be strikingly effective were, as professional psychologists and educators, skeptical about whether the relatively limited intervention provided by the investigation would be sufficient to attain the hoped-for goals; (3) systematic check of such things as examiner errors and test results judged to be spuriously low or high in comparison with other test results from the same child suggests that no consistent examiner bias for or against either Hypotheses I or II existed. The only measurement for which complete absence of examiner bias is guaranteed, however, is in the first and second-grade follow-ups standardized achievement testing and teacher-paired comparisons of achievement and adjustment. For this, neither the examiners nor the teachers knew either the purpose of the study or the group to which the children being tested belonged.

Psychosocial Differences. These have been discussed earlier. In summary, the present population was so homogeneous--so uniformly low in all socio-cultural-economic-education characteristics--that the traditional techniques employed to differentiate culturally disadvantaged populations from middle class populations failed to discriminate among the psychosocially deprived families used in the Indiana Project. Only one category--a social worker's relatively subjective classification of gross deprivation--showed any discriminating power. The small number of children so characterized seemed to succeed less well than those in other categories. One group (the Study II kindergarten contrast group) seems to have achieved somewhat more poorly than any other subgroup of the 10 in the total study because of the chance heavy concentration of such severely psychosocially deprived children within it. Over-all, however, level of psychosocial deprivation, as measured by traditional techniques, does not predict the later behavior of the children included in the study.

Sibling School History. It had initially been planned to analyze the behavior changes of the children in the present study in terms of family pathology, including school history of other children in the family. As pointed out in the immediately preceding section, the total study population was so homogeneous and uniformly severely disadvantaged that methods of analysis available to the investigators were insufficiently sensitive to reveal differences, with the exception of suggested trends at the grossest level of deprivation.

The school history of the subjects' siblings presents similar difficulties.

The average child enrolled in the present study had two older siblings with public school histories of whom 75 percent had records of school difficulty, including failure of at least one grade, placement in special class, dropping out of school before graduation, or exclusion because of learning disability combined with behavior problems. The overall percentage for the EPS group was 81, for KC 63, and for AHC 82. Since all

groups were relatively homogeneous with regard to older sibling school failure histories, analysis of the results based on this criterion was not fruitful.

Hawthorne Effect. Strictly speaking, the Hawthorne effect is the motivation provided to the subjects of a study by their knowledge that they are participating in a special endeavor of some type. For the children of the present study, this was most clearly provided by the impact of "droppers in."

EPS₁ and EPS₂ certainly had many more such visitors, some of whom worked actively with individual children, than did any of the other subgroups in the total study. The effect of such visitors was mixed. EPS₁ and EPS₂ teachers complained about the number of visitors and observers sufficiently vigorously that a limit had reluctantly to be imposed, although even after it has been set (no more than two people working with a group at any one time) these two groups had more contact with adults than any of the other groups. The children may have profited from such visitors and the efficiency of the teachers may have been impaired. It is impossible to judge what the resultant effect of these opposing forces was. According to one criterion (Binet gain, pre- to posttest), there was no interaction, since (for example) EPS₁ showed the largest gain, EPS₂ the smallest. In its pure sense (the children's being aware that they were the subjects of special study), the Hawthorne effect probably did not operate markedly in the present study. But the EPS groups may have profited differentially from their wider contacts with adults.

The Hawthorne effect may be mediated by teachers', administrators', and communities' awareness that an experiment is being conducted. In this construction of the term, the effect undoubtedly existed both for the EPS and KC children. Their teachers, school administrators, families, and any part of the community that was interested knew they were undergoing a new and different type of school experience. Since Bloomington had kindergartens (on a fee basis), and nursery schools, the Hawthorne effect in the sense of participating in something entirely new and unique existed less for EPS₁ and EPS₂ than for EPS₃ or for KC₁, KC₂, and KC₃, each of which functioned in a town that had not previously had either nursery schools or kindergartens. Since they were true novelties such a Hawthorne effect should have been greatest for EPS₃ and for KC₁ (all kindergarten contrast groups were conducted in the same town and presumably the Hawthorne effect would have been reduced successively for KC₂ and KC₃). However, the pattern of pre- to posttest changed by group, the Hawthorne effect, as far as community reaction was concerned, did not play a differential role in the present results.

The investigators were often surprised to discover how little the first and second grade teachers who taught the study's children in first and second grade knew of their pupils' past history. Such informal evidence suggests to them that, because of this lack of information and interest in the children's background, the Hawthorne effect may have been much less than they had feared.

Regression Effects. Analysis of intelligence test data shows that

there is no significant relation between initial level of Binet I.Q. and amount of gain shown pre- to posttest for EPS, KC, or AHC children. A baseline for pre- to posttest change is perhaps best established by the average Binet I.Q. pre- to posttest change for all AHC children ($N = 56$). Their mean gain on this measure was 4.09 points.

Chronological Age. The KC groups, because of different requirements for age of entrance to first grade, averaged two months older than the EPS and AHC children. This was controlled in part by the use of quotients rather than mental ages, and by analysis of covariance.

As a further check, analysis of pre- to posttest Binet I.Q. change for older versus younger children was conducted. The analysis revealed no significant age affect on I.Q. gains.

Sex Differences. The study included 82 boys and 60 girls. The ratio of boys to girls differed from group to group, as can be seen from the Results tables (for instance, there were more than half again as many boys as girls in the total AHC group, but the numbers were almost equal for the total KC group).

The mean difference in pre- to posttest Binet gain between the sexes for all children in the study was 1.32 points, favoring the boys. Boys gained more than girls for each group (2.19 points for total EPS, 0.80 points for all KC, and 3.05 points for all AHC subjects). In no case was the difference in mean gains between the sexes significant. Any practical difference it may have made would have been to the benefit of the AHC children, since there were 36 boys but only 21 girls in the group. The EPS total included 24 boys and 18 girls; the KC total included 22 boys and 21 girls.

Subgroup Differences. Discussion of the interactions of the school and the children of the present study should stress the subgroups from Study I, for which results are available through second grade. As has been said in Results, both intervention groups (EPS and KC) had reached stable mean I.Q. levels on the Binet at the time of the posttest at the end of the intervention year. AHC-L and AHC-D did not reach these stable levels until their follow-up 1 (end of first grade, F^1) testing. The modest positive correlation of Binet I.Q. with achievement (as measured either by teachers' marks or standardized achievement test data) indicated that the KC, AHC-L, and AHC-D groups were achieving according to prediction. However, the substantially brighter EPS children were not only achieving less well than the stringent AHC-L comparison group, but there was no correlation between their I.Q.s and their achievement (the relation is actually negative in direction).

However, there was a relatively satisfactory positive correlation between Binet I.Q. and teacher grades for the EPS₂ and first and second grade achievement failure for EPS₁, it was necessary to examine the Binet performances of these groups.

While there were no significant pre- to posttest Binet I.Q. gain

differences for EPS₁ and EPS₂, the tests that entered into the gains were different for the two groups. Examination of the differences in the components of the gain scores may possibly throw light on why Binet I.Q. predicted academic achievement for EPS₂, but not for EPS₁.

EPS₁ gained significantly more than EPS₂ on 3 of 30 Binet items that permitted comparison between the groups. These items included two Opposite Analogies (VI-5 and VII-5) and Item VI-3: Mutilated Pictures. Broadly speaking, these are "problem-solving" items.

EPS₂ gained significantly more than EPS₁ on 9 items. These were IV-6-5: Three Commissions; V-1: Picture Completion; V-2: Paper Folding; V-3: Definitions; V-4: Paper Folding; V-5: Pictorial Similarities and Differences; VI-1: Vocabulary; VI-4: Number Concepts; and VI-6: Maze Tracing.

This pattern of differential EPS₂ gains suggests that the children have acquired very directly school-related skills to a greater degree than EPS₁; they hold instructions in mind and execute them; they excel in items requiring motor skills, and more of them are superior in expressive vocabulary and number tasks. In short, the EPS₂ group to a greater degree than the EPS₁ group seems to have acquired techniques for attacking the formalized, rote memory type of tasks typically required in elementary school.

It is likely that these differences were associated with the major curriculum changes made in Study II. The curriculum for EPS₂ became more structured and activities centered around traditional school units such as the farm, home, foods, transportation, and communications. In addition, formal fine motor lessons were introduced.

A comparison of items passed by the EPS₁ and EPS₂ children indicating that the two groups exceeded one another an equal number of times. If there is any validity to these data, then, it might be predicted that the EPS₃ group will perform on achievement in between the EPS₁ and EPS₂ groups when follow-up data are collected in the Spring of 1968.

Ordinal Position in Family. Research literature indicates that first and only children achieve better in school than later-born children. In view of this, it was considered necessary to check for this factor. Granted the accuracy of the reported literature, AHC children would have been favored over EPS children, who would have been slightly favored over KC. The percentage of EPS children who were first or only children was 18.2; of KC children, 13.6; and of AHC children, 29.8. Comparable figures for "youngest in family" are 22.7, 18.2, and 19.3. There is obviously no difference among the groups in the percentage of youngest children.

For the 10 subgroups in the total study, AHC-L (a consistently successful group) and AHC₃ have the highest percentage of first and only children (35.7 percent each), and there were no firstborn or only children in KC₁. Therefore, insofar as this variable has influenced the results of this study to date, it would have worked to the advantage of the

AHC-L group and thus against Hypothesis II. No regular school data are yet available for the AHC₃ group.

CONCLUSIONS AND IMPLICATIONS

General Conclusions

1. Hypothesis I, predicting that a diagnostically based curriculum intervention (EPS) program would more effectively ameliorate the effects of severe psychosocial deprivation in a population of semi-rural and small town Appalachian five year old, borderline mentally retarded children than would a traditional kindergarten experience, which in turn would be more effective than continuing at-home residence was generally supported. Results for intelligence, language, and personal-social development generally fell directly in line with prediction. For Fine and Total Motor skills, either type of school experience was associated with more gain than was continued residence in the home.

2. Hypothesis II predicted a similar ordering of regular school experience for the three treatment groups. Considering all results, both at the end of the first grade year for two groups and for one group at the end of the second grade year, the hypothesis (particularly for EPS) was more often supported than rejected, except in the motor skills area.

However, the results are mixed and only further follow-up can provide a final conclusion for the three groups that have been studied. The predicted success pattern was most clear in the personal-social areas, next most clear in intelligence, third clearest in language, mixed but somewhat positive over-all for academic status, and nonexistent in the area of motor skills.

3. Results from the present study emphasized the need for replication within psychology and education. Had Study II been conducted in isolation, both Hypotheses I and II would have been unequivocally supported according to nearly every criterion employed in this investigation.

Implications

The proper education of psychosocially disadvantaged children prior to formal schooling has received much careful attention in the past few years. Panaceas for overcoming the malignant effects of psychologically impoverished backgrounds upon young children have not been forthcoming. It is naive to expect a remedy or even a combination of remedies for these conditions to come easily. Education alone is not likely to be totally effective, just as economic improvement in isolation produces no dramatic changes. Research efforts applied to the problem have produced encouraging but meager results, and have raised as many questions concerning child development and teaching as they have answered.

In these last few paragraphs, the authors attempt to delineate some of the questions, implications, and additional hypotheses that

have grown out of their own efforts at intervention, as well as their knowledge of the work of others. Questions of the timing, duration, and scope of intervention as well as its focus and implementation are discussed briefly. Finally, some suggestions are ventured for future research needed to answer these questions.

Timing, Duration, and Scope of Intervention

Timing. Two questions regarding the optimum time for intervention underly compensatory education programs for disadvantaged children. The first question is: Is there a critical period for the development of "basic" (optimal) intelligence? If the answer to this is yes, as many believe, then an intervention must occur before the critical period is reached. Such intervention is more one of prevention than it is of amelioration of the effects of psychosocial deprivation.

There is remarkable agreement among the studies about the effects of intervention introduced at two, three, four, five, and (for the at-home contrast children of the present and other studies) six years of age. At the end of intervention periods carried out at widely different ages, there are remarkable increases of posttest over pretest performance, and the posttest level has proved to be stable. This seems to indicate that changes in manifest capacity are possible as late as six years of age.

For older children (i.g., the adolescents of the Wayne County Training School Studies discussed in Related Research for whom total intervention began at about 13 years) the pre- posttest gains, while statistically significant, are modest but also stable.

This suggests, tentatively, that intervention designed to regain lost ground, as it were, loses effectiveness some time during the elementary school years.

Duration. Intervention studies reported in the literature, or currently known to the authors, have ranged from the 50 hours of language teaching employed by Dawe (1942) to the two years of school and home intervention reported by Weikart (1967 b). Remarkably little difference is shown by the mean gains associated with these extreme ranges in time of treatment.

But "life-time" studies (e.g., the Israeli kiboutz through secondary school plan) suggest that some types of intervention (or prevention) may result in children reaching some theoretical optimum, in contrast to "regaining lost ground."

Scope. The authors believe the present study has been too limited in scope, and base their belief on the modest positive results they obtained for their experimental subjects in regular school achievement.

The data are far from clear about implications for the scope of intervention. It may be limited (to the school, as in the present study;

or to the home). It may be multiple, as exemplified by Weikart (1967 b) and Gray and Klaus (1965) where attempts were made to modify behavior both through school and home interventions. It may extend even further, to community reform, total school upgrading, and bussine children from ghetto to middle-class schools. The similarity of findings among, for example, Weikart, Gray, and the present investigators suggests no clear superiority of multiple over single (school) intervention.

Scope may be massive, as in foster home and kibbutz placement. Results from this type of intervention as indicated by Skeels (1966), are the most impressive of those reported in the literature.

Ancillary to this discussion on scope of intervention is the question of home intervention following preschool compensatory education experiences. The disadvantaged child may have profited greatly from his pre-school program, and may continue his status in elementary school. However, he goes to school for no more than six hours a day, less if he is in the split session system still followed by so many schools, and returns to his disadvantaged home. The middle-class child continues "ancillary" education all day long: his parents question him about what went on during the school day, hold family discussions at breakfast and dinner, encourage free reading, help with homework, and provide on the whole a total augmenting setting that is usually entirely lacking for the disadvantaged child.

Curriculum Content

Specific versus General. Basic to any philosophy of compensatory education is the assumption made by the investigator about transfer of training. The generalist believes in maximizing the flexibility of cognitive structure. In other words, his assumption is that compensatory education should develop cognitive processes which in turn will be used by the child to cope with school related tasks.

The "specialist" believes in direct transfer. That is, compensatory education must train directly for the tasks the child will face in school.

Bereiter's (1966) program, to the authors' knowledge, is the best example of a highly specific program directed toward training the child to meet the school as it is. The present study, and the methods used by Gray and Weikart stand on middle ground. Traditional, high per pupil cost, developmentally oriented nursery schools and kindergartens represent the other extreme of the coninum.

Schools as they are exist, and will continue to exist. Only a false idealism denies that children must be prepared to meet them as they are. In the authors' judgment, the best of the three studies herein reported was Study II, where the curriculum was consistently undergirded by formal language and motor lessons, which were incorporated into instructional units such as those found in the early elementary grades.

Process versus Product. The arguments for this sub-topic are similar to those outlined immediately above. Piaget, Montessori, and

the learning-to-learn model provide the purest models of process instruction; while Bereiter seems best to illustrate product instruction. The groups in the present study taught in a manner closest to a product tactic were EPS₂ and KC₃. The EPS₂ group has already shown excellent achievement progress in grade one. No follow-up data are yet available for the KC₃ group, but pre- posttest results were as dramatic as they were for its paired EPS group.

As with the Specific versus General strategy, the authors take a middle position between process and product training. It is idle to prepare children for a hypothetical, ideal elementary school; yet he is cheated if he is not encouraged to think inductively, be curious, and work toward the production of originals. The authors believe their Study II best realized the goal of combining process and product training.

Teaching

The greatest deficiency in teachers' training and skill discovered by the authors during the conduct of the present study was their weakness in diagnostic teaching. Conventional methods, either of special education or elementary education, as represented by these well-trained and intelligent young women, came off poorly according to the criterion of effective diagnostic teaching. It is, therefore, apparent that effective diagnostic teaching procedures must be taught in teacher training institutions if it is to be effectively implemented.

A second implication from the present study is that "packaged materials" are ineffective if the teacher does not believe in their validity. This is to say that the materials must appear to her to be related to the goals she holds for the children's education.

In the hands of skilled teachers, packaged materials may limit their flexibility and creativity in curriculum development. In the hands of unskilled teachers, such packaged materials may be useful in that they are likely to be better than any that the teacher may be able to devise. On the other hand, packaged materials when supplemented with ancillary activities may be extremely effective.

A third implication for teaching (and curriculum) strategy is that compensatory education probably cannot afford the luxury of non-academic activities as ends in and of themselves. It is all right for middle-class nursery and kindergarten children to learn to appreciate (and, within their capacity, produce) art and music for their own sakes. But for disadvantaged children, these activities should be both enjoyable and generally acculturating and carry an extra burden of instruction in such areas as language and motor skills. This double agenda should not be accidental, but well-planned, clearly formulated, and consistently carried out.

Implications for Research

The center of attention of applied research workers in the area of cultural deprivation has been on the inner-city Negro child. Fewer data

are available concerning the migrant farm worker, the Mexican-American, the Puerto-Rican, the Caucasian, or rural children of all ethnic groups who have less than adequate environmental support. Studies of the effects of environmental manipulation with deprived children are not new, but neither do they provide definitive answers to educational problems associated with deprivation. Action programs such as Head Start, the Education Improvement Projects, and Follow-Through have depended on global, non-specific approaches to remediation in the absence of a solid foundation of knowledge concerning more effective treatments. While it is hoped and believed that these programs, there still needs to be additional support for their evaluation and continued development of research on teacher-training, curriculum, and home intervention. Perhaps the National Laboratory for Research and Development in Early Education will provide some of the basic resources needed to continue these efforts.

As a result of the efforts of the authors over the past few years, it seems apparent that much additional knowledge is needed about the interaction of treatments with individuals who vary immensely from other individuals. As William Fowler (1966) has so well argued, it is time to abandon the idea that the concept of social deprivation is the most crucial variable in the study of educational retardation. This is especially important when it is so well-known that the negative characteristics (as judged against some criteria) of the deprived are not isolated within any ethnic caste, or social-class group within the country. The bare beginnings of adequate research are now appearing in the literature. The Hess and Shipman (e.g., 1965) studies of maternal teaching styles across social-class but within one racial group are most provocative.

Research that continues to isolate independent variables and their effects on development with special attention given to individual differences should be encouraged, as should a continued search for more optimal environmental manipulations which match the capabilities of individual children.

It is also apparent, to these authors at least, that reliable techniques for adequately diagnosing the strengths and weaknesses of young children and which have implications for educational treatment are in short supply. It is necessary, the authors believe, to continue to search for developmental theory that will lead to more fruitful assessment.

The authors continue to hold the faith that much retardation and consequent suffering can be prevented through educational efforts. They also realize that education alone will not suffice. Therefore, they look to the continued production of information from the medical and behavioral sciences which will contribute to the applied research work and action programs now underway.

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APPENDIX

Appendix A

Weekly Diagnostic Rating

Cultural Deprivation Project-Rating Scale for Children to be used in conjunction with the weekly lesson plans.

<u>Rating</u>	<u>Category Description</u>
1	No specific work needed in this area--the child is as competent as can be expected.
2	Some attention required; work in this area is not crucial for this child; exercises on relevant tasks should be given when time permits.
3	Considerable attention required; exercises on relevant tasks should be given as often as possible.
4	Major deficiency; daily attention to this area.
5	Child not ready for work in this area; exercises would be inappropriate for child at this time.

Name of Child	Perception	Manipulation	Socialization	Language	Cognition	Motivation

Appendix B

Performance Rating Used for a particular lesson plan.

Rating

1. Interest of children in activity.

Poor		Good		Excellent
1	2	3	4	5

2. Stimulation of children's language.

Poor		Good		Excellent
1	2	3	4	5

3. Stimulation of children's thinking.

Poor		Good		Excellent
1	2	3	4	5

4. Difficulty level of activity.

Very Easy		Adequate		Very Hard
1	2	3	4	5

Appendix C

Rules for Analysis of Language Data

1. Responses - each utterance occurring between utterances of the examiner. A response is a verbalization terminated by the child by final juncture, i.e., intonation marker indicating completion of the utterance. It may consist of one "word", such as "uh-uh" or several so-called "sentences" (an exception to this may be an interruption of the child by the examiner). It may also be defined simply as "a verbal response of the child occurring between verbal responses of the examiner." An exact repetition of a preceeding utterance was not counted.
2. Words -
 1. Contractions of subject and predicate like "it's" and "we're"--2 words
 2. Contraction of verb and the negative such as "can't"--1 word
 3. Each part of a verbal combination is counted as a separate word, thus, "have been playing" is counted as three words.
 4. Hyphenated and compound nouns--1 word
puppy-dog
kitty-cat
baby-doll
 5. Expressions such as "all right", "uh,huh", "huh-uh"--1 word
Words such as Christmas tree, choo-choo train, Birthday Party--2 words
 6. Elipsis such as: n neris (and there is)--3 words
ana, gonna, hafta, kinda, wanna, wanta, etc.--2 words
 7. Words occurring in mazes are not counted.
3. Unanalyzed Elements (or Short Utterances)

These are usually short responses of one or two words which cannot be futher analyzed:

 - Lacking subject and verb--sometimes, uh-huh, okay, down the street
 - Or a string of words naming--a cat, a dog, and a chicken, a horse, etc.
 - If subject can be assumed, eg. "(you) whip them", it is not considered an unanalyzed element
4. Mazes - non-fluencies and unintelligible units, which interrupt the flow of language, i.e.
 1. noises - unintelligible sounds or sequences of sounds
 2. holders - "ah", "uh", "mmmmmm"
 3. repeats - repetition of sounds, syllables, words, phrases, sentences
 4. edits - change of direction

Also considered as a maze is the repetition of an utterance which the examiner did not understand and asked the child to repeat.

5. Negative Responses - This is the verbal refusal of a child to respond. It usually takes the form of "I don't know", but may be "no", "huh-uh", "I don't wanna", "no, I'm done", etc.
6. Extraneous or Irrelevant Responses - These are responses not related to the test questions. For example, a child when asked about his house and family may ask about the tape recorder, may be distracted by objects in the room or noises outside, etc. He may, when asked to tell a story about a stimulus picture, begin talking about his house and family. Questions asked about the pictures or story were considered irrelevant. What this measure reveals most is task and communicative involvement, distractibility, etc.